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Why Not Public Works?

SIR EDWARD GRIGGS at the Railway Officers and Servants Association dinner last Friday, quoted the enormous capital expenditure on development in the early days of railways, and suggested the possibility of a resumption, if not perhaps on the same scale, of capital expenditure as a means of overcoming some of our current troubles. The difficulty, of course, is to spend capital profitably, and, in view of that difficulty, there is much talk today of undertaking capital works at the public expense. Which recalls the extraordinary vacillation of opinion on this subject. In 1930 the undertaking of public works was frankly regarded as a mixed blessing; in 1931 it was pronounced a definite curse and was all but stopped; now in 1935, many who agreed with the official view of 1931 are changing their minds. It is, of course, perfectly obvious that, physically, the development of public amenities cannot be anything but in the public interests. For example, to build new roads and rebuild old to suit modern conditions must lessen the risk of accident to those who use them. To raze the slums, and provide modern houses for the unfortunates who dwell in them, can have nothing but good effect. To improve the railways cannot but be of all round benefit. But there is one all-pervading difficulty which remains to be overcome, that of financing public works. As public money is spent, so debt piles up and remains as a millstone about the necks of the community unto the third and fourth generations—which seems a strange parallel to the simultaneous increase in the *real wealth* of the public.

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The Railways and Navy Week

In an age which seems predisposed to be ungracious towards instruments designed for the general safety, the British Navy deserves special praise for retaining its hold on public esteem. Military displays have been accused of nourishing bellicose sentiments in the breasts of susceptible youth, but Navy Week is rarely so much as blamed for breeding a provocative addiction to the hornpipe. Whether we ascribe this to the pacific intentions of the Senior Service or to the assiduous propaganda which diverts our attention to the conquests of its members in other spheres than that of war, the fact remains that the event exercises a wide popular appeal. It would be appropriate if in this Jubilee Year some phase of naval activity could be exhibited in every seaside resort throughout the country, but since that is impossible an additional responsibility devolves upon the railways in enabling all those so minded to reach the three towns where the displays are to be held. These are Portsmouth, Plymouth, and Chatham, the dates are August 3 to August 10 inclusive, and the railways are offering attractive facilities.

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The Week's Traffics

The Southern Railway is the only one of the four group companies to have improved its passenger receipts, and declines on the other systems make the aggregate increase in this traffic over 1934 less by £39,000 than last week. There is still, however, a total gain of £150,000 compared with the preceding year. Of the two companies which recorded increases in coal traffic during the eleventh week, the Great Western has now fallen back to the same position as last year, but a setback of £9,000 on the L.M.S.R. follows a gain of £12,000. Aggregate coal receipts of the four companies are now £268,000 behind the 1934 position, all companies showing decreases, but in merchandise the Great Western has gained £21,000.

	12th Week				Year to date.	
	Pass., &c.	Goods, &c.	Coal, &c.	Total.	Inc. or dec.	
	£	£	£	£	£	%
L.M.S.R.	– 13,000	– 4,000	– 9,000	– 26,000	– 80,000	– 0·61
L.N.E.R.	– 8,000	– 8,000	– 9,000	– 25,000	– 190,000	– 1·95
G.W.R.	– 10,000	+ 2,000	—	– 8,000	– 34,000	– 0·64
S.R.	+ 2,000	– 5,500	– 2,500	– 6,000	– 45,000	– 1·14

London Transport receipts have recovered from last week's fall of £4,600 and are now up by £9,400.

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Rhodesian Transport Progress

One of the most striking features of the year in the South African transport world was the remarkable recovery in the position of the railways of Rhodesia—a fact duly and approvingly noted by the President of the British South Africa Company at the recent annual meeting of that body. Stressing the point, Sir Henry Birchenough quoted some highly interesting facts and figures bearing on the Rhodesia and Mashonaland railway companies, whose gross revenue was about £3,200,000, or over £1,000,000 more than in the year ended September 30, 1932, while the railways were able to earn this large additional sum with slightly less expenditure than in 1932. As a result of this increase in business, the two railway companies together made the small loss of £34,000 during the year ended September 30, 1934, as against the losses of £550,000 in 1933 and £948,000 in 1932. Preliminary reports in regard to the first four months of the present financial year indicated that the improvement of the last six months of the past financial year had been well main-

tained, and that the two railway companies together were now operating at a profit. It also transpired that the road motor services introduced when the speaker was in Rhodesia in 1927 were now nearly self-supporting and had been of great value in preventing agitations for the construction of unremunerative branch lines; whilst the Rhodesian & Nyasaland Airways Limited, formed in 1933 by the Beit Railway Trust, was already making considerable progress.

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Overseas Railway Traffics

Of the two South American companies which showed decreases for the 36th week, the Central Argentine has reduced its deficit from £7,209 to £306, but the Buenos Ayres Western presents a comparison with the preceding year which is worse by £3,854. Exchange has been 16·92 pesos and 16·91 pesos in the past fortnight, compared with 17·08 and 17·06 pesos in the corresponding period of last year. Canadian Pacific takings improved by £3,800 in the 10th week, but have since suffered a further setback. Bombay, Baroda and Central India traffics, similarly, have failed to maintain an increase of £2,625 recorded in the forty-ninth week of operation. Argentine North Eastern and Entre Rios aggregates show declines of £42,080 and £9,247 respectively.

	No. of Week	Weekly Traffics	Inc. or Decrease	Aggregate Traffic	Inc. or Decrease
		£	£	£	£
Buenos Ayres & Pacific ..	38th	101,656	+ 7,635	2,835,916	– 364,603
Buenos Ayres Great Southern ..	38th	179,480	+ 23,032	5,446,138	– 686,359
Buenos Ayres Western	38th	50,266	– 5,478	1,673,678	– 311,585
Central Argentine	38th	117,818	– 306	4,478,674	– 589,731
Canadian Pacific	11th	427,000	– 16,600	4,700,600	– 143,000
Bombay, Baroda & Central India	50th	171,525	– 4,950	7,948,725	+ 297,150

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Siamese State Railways

Although there was an increase of Baht* 58,158 in the gross receipts of the Royal State Railways of Siam, the report of which for the year Buddhist Era 2475 (April 1, 1932-March 31, 1933) has recently reached us, this is to be attributed more to the extension by some 50 km. of the North Eastern section between Bua Tai and Khon Kaen than to any substantial revival in trade conditions. The gross earnings for the year amounted to Baht 10,814,032. There were improvements of 9·17, 12·34, and 43·62 per cent. respectively in the goods, livestock, and miscellaneous receipts, but these increases were almost completely offset by a 12 per cent. decline in passenger earnings. Substantial all-round economies, however, were made in expenditure, with the result that a saving of Baht 1,190,332 was effected under this head; the figure for the years B.E. 2475 and 2474 were Baht 6,131,364 and Baht 7,321,696 respectively. The ratio of working expenditure to earnings was thus reduced from 68·07 to 56·70. The total length of line open at the end of the year was 2,995 km. as compared with 2,996 km. at the end of the previous year. A further 167 km. of line are at present under construction or have been opened since the issue of the report, while an additional 406 km. are under survey.

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Traffic from Flowers

The popularity of flowers, which has doubtless become more widespread owing to the facilities afforded by the railways for town workers to live in suburbs and cultivate their own gardens, is a source of traffic of two sorts. The more important is the conveyance of blooms to London and provincial markets, in which the Great Western Railway plays a leading part due to its connections with the Scilly Isles. During January and February of the present year, the tonnage of flowers from this source landed at Penzance amounted to 673, as compared with 459 in the same period of 1934. There is a regular service for traffic of this kind from Penzance at 4.25 p.m., but during the first three weeks of March it was necessary not only to augment this and other regular trains, but to run twenty specials. The other type of flower traffic proceeds from passengers making excursions to view the bulb fields of Holland, and for their benefit the L.N.E.R. has arranged week-end trips from Liverpool Street on April 14, 21, and 28. The outward journey will be made on Saturday nights by the Hook Continental. A motor coach tour through the bulb fields of Lisse, Hillegom, and Haarlem will follow on the Sunday, and London will be reached again at 8.38 a.m. on Monday.

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Railway Removals

Two removals imposing unusual demands on railway service have been carried out in the present week. In one case the problem of conveying the diversified furniture and effects of a school was effectively solved by the use of containers; in the other, the transport of the livestock and equipment of a farm called for, not, as might be imagined, an ark, but a special train to carry the job through between milking times. The school removal took place on the Southern Railway between Portslade, on the outskirts of Brighton, and Washington, near Worthing. Six containers were kept in circulation, speeding up the work by the fact that it was unnecessary for the lorries to stand idle while the consignments were being unloaded. Packing started at 6 a.m. on Monday, March 25, but the removal is not due for completion until tomorrow (Saturday) afternoon. The farm was transported by the Great Western Railway from Fenny Compton, near Leamington, to Compton on the Newbury-Didcot line, between late on Monday night and early Tuesday morning. The livestock to be handled comprised one thousand head of poultry, forty head of cattle, sixty-five sheep, five pigs, and six horses.

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Railways on the Air

Railways play such an important part in the life of the community, multitudes of whom are so keenly interested in their operation, that it is somewhat surprising that up to now comparatively little has been heard about them on the ether. Happily, however, that sort of thing will soon be remedied, as the railway companies, it is understood, are now co-operating with the B.B.C. in a series of broadcasts to be called "Railway Rhythm," wherein sound impressions will be given of various railway activities relating to the working of dynamometer cars, signal-boxes, marshalling yards and so forth. All this is, of course, a move in the right direction. Recently, it may be recalled, listeners heard a talk between a train crew prior to the departure of the Night Scot from Euston to the North, in the course of which some interesting facts were elicited; whilst a day or two later there was broadcast from Euston an Empire programme feature entitled, "Trains from the North," which dealt with the arrival of the overnight expresses from Scotland, including appropriate commentary and "effects" from signal-box and station—one of the speakers being the driver of the 10.45 p.m. express ex Edinburgh, who went straight from the footplate to the microphone, where he described his trip from Carlisle. "Railway Rhythm" is a subject which offers manifold possibilities on the wireless; and we foresee the time coming when millions will be listening with avidity to all sorts and conditions of men in the railway world—from "Sunny South Sam" and railway *litterateurs* to others of even greater distinction.

* £1 = 10·99 Baht at par.

May Accelerations

A feature of the May timetables, reviewed on page 618 of this issue, is the addition of four runs to the list of those timed at over 60 m.p.h. from start-to-stop. In the half-hour between 12.40 and 1.10 p.m., four trains will run in succession into Euston, all booked from their penultimate stop at a speed of over a mile-a-minute—at 12.42 p.m. from Blisworth, 62·8 miles in 61 min.; at 12.50 p.m. and 1.10 p.m. from Crewe, 158·1 miles in 154 and 155 min.; and at 1 p.m. from Wilmslow, 176·9 miles in 172 min., three of which are newly accelerated. An evening express will also run up from Blisworth in 62 min. On the London & North Eastern Railway a second run is to be introduced over the 44·1 miles from Darlington to York in 43 min., start-to-stop, forming part of the journey of a new cross-country restaurant car express from Newcastle to Manchester and Liverpool. Another important development is that the Scarborough Flyer, which last year had its time over the 188·2 miles between King's Cross and York cut from 210 to 195 min., is this year to be accelerated further, bringing the time down to 190 min., and the average speed up to 59·2 m.p.h. In view of such improvements, it seems very unfortunate that it should have been found necessary to decelerate by 15 min. the midday express from St. Pancras to Glasgow, especially in view of the fact that the powerful " 5X " 4-6-0 locomotives are now available for this service.

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German Railway Centenary Plans

As the centenary of opening of the Nuremberg-Fürth line, the first railway in present day German territory, occurs this year, it has been known for some long time that the Reichsbahn was taking active steps to mark the anniversary suitably. The main difficulty arose from the fact that the exact day of opening was December 7, which falls too late in the year for adequate public ceremony. Now the preliminary plans have been announced, and it is seen that the authorities have taken the wise course of celebrating the year rather than the day. The proceedings will begin at the end of May with a memorial ceremony for Johannes Scharrer, one time Mayor of Nuremberg, as the result of whose efforts the first railway in Germany was inaugurated. Scharrer was born on May 30, 1785, so that the ceremony serves also to mark the 150th anniversary of his birth. The actual railway celebrations will take place towards the close of June and the beginning of July. The Railway Museum at Nuremberg will present an historical exhibition illustrating the development of the railway, and the Reichsbahn will also have an exhibition in Munich. During the summer an exact copy of the original train which first travelled the historic Ludwigsbahn (Nuremberg-Fürth) track will run to and fro over the same section.

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A Central Station for Oslo?

Oslo has at present two terminal stations, the East and the West. The former is much the larger and the signalling there was described in our issue for October 12, 1934. The West station originally served some narrow gauge lines, the last of which is undergoing conversion now. Suggestions have been made from time to time for one central station, the earliest dating back to the nineties, when two engineers named Gleim and Eyde proposed to adapt the East station for this purpose by adding some through lines to it, while retaining the West station. The question has received renewed prominence from a lecture delivered by Herr Otto Aubert in October and summarised in the *Teknisk Ukeblad*. He suggests the abolition of the West station and lines approaching it and the construction of a new three track line, one track being for goods trains, through the city, partly in tunnel, to the East station, where there would be six through platform lines to the north of the existing ones. The whole station would be raised to a higher level and certain street improvements facilitated. This would improve main line running from east to west, while the abolition of the West station and approach lines would free much valuable space on the harbour front. Herr Aubert is strongly opposed to the proposal that the State should close its local services and transfer the traffic to the roads.

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Level Crossings on Light Railways

The Totton, Hythe and Fawley Light Railway was sanctioned in 1921 under a Light Railway Order which exempted certain level crossings from the provision of gates, conditionally on cattle guards and warning boards being fixed. In our issue of November 10, 1933, we summarised the report by the late Colonel Anderson on the collision of July 26, 1933, at Jacob's Gutter Lane crossing, between a passenger train from Totton and a motor lorry from Marchwood. It was stated that at a point 70 yd. from the crossing there was a large warning board on the road from Marchwood, and that a road driver could see a train from the board and never lose sight of it. The warning board appears in sight at a distance amply sufficient to stop any motor vehicle with a margin of some 70 yd. from the level crossing. On March 21 last, a private car travelling in the same direction as the motor vehicle already mentioned, was similarly struck by a train, but, fortunately, without serious personal results. This further incident is of importance, because Colonel Anderson pointed out in his report on the earlier collision that several new houses had been erected on the south side of the railway, and conditions on that side of the crossing were not as good as on the side where occurred the two accidents here dealt with, and it was recommended that the railway company and the highway authority should be asked jointly to consider the installation of what would be the equivalent of street traffic signals.

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Recent Bridge Testing Practice in India

In no branch of railway work in India is practice more up to date than in bridge engineering. Indian bridging practice is, in fact, in the fore-front of such practical and theoretical work throughout the world, a fact to which the many papers read by bridge engineers on Indian railways before the Institution of Civil Engineers bear testimony, especially when read as appendices to the reports of the Indian Bridge Committee published some years ago. If further proof were needed, the article that begins in this issue of THE RAILWAY GAZETTE would surely leave no doubt upon this point. India is the land of great bridges and there is no important railway that has not one or more of them: often, as in the case of the North Western, they occur at frequent intervals and in all directions. Experience is therefore plentiful and the importance of the post of bridge engineer is great and sometimes carries with it the rank of Deputy Chief Engineer. The average railway engineer in India also, has, more likely than not, experience in deep substructural bridge work, including well-sinking, for the bridge department usually confines its energies to girder and steelwork (including reinforced concrete spans and special jobs), leaving the abutments, piers, foundations of all kinds and approaches to the construction or maintenance engineers. Bridging experience in India is therefore widely diffused and comprehensive, and the value of our article is undoubtedly great.

L.N.E.R. Assessment and the Freight Rebates Fund

IN the course of the lengthy statement made on March 21 by the Chairman, Mr. Joshua Scholefield, K.C., at the hearing of the Railway Assessment Authority on the representations by the L.N.E.R. and certain local authorities concerning the assessment of £3,500,000 which appears as the net annual revenue of the L.N.E.R. undertakings as a whole in England, reference was made to the likely consequences of a nil assessment upon the operations of the Railway Freight Rebates Fund. On the resumption of the hearing on the following day Mr. Walter Monckton, K.C., counsel for the L.N.E.R., said that he had been instructed to say with reference to this that "In no case where a rebate has been properly allowed can a trader be called upon to repay it. Any over-payments into, and repayable out of, the Railway Freight Rebates Fund can only be a debt of the fund and cannot involve any liability on the part of any trader or other railway company."

The railway companies under the Local Government Act, 1929, were granted rate relief in respect of freight transport hereditaments, but on the terms that the companies paid that rate relief into a fund known as the Railway Freight Rebates Fund. The fund is administered by the Railway Clearing House under the Railway Freight Rebates Scheme, which was prepared in accordance with the provisions of the eleventh schedule to the Act of 1929. The scheme, which provides for the allowance by the railway company for rebates from the carriage charges made in respect of certain selected traffics (*e.g.*, coal for export), is substantially as follows. The rate relief of the companies is estimated for the ensuing year, the financial year of the fund being from October 1 to the following September 30, and in addition an estimate is made of the rebateable traffics likely to pass during the year. After certain allowances have been made for a contingency fund and administrative expenses, the rates of the rebates are fixed for the year on these estimates. The railway companies have to allow from the carriage charges made by them the rebates so fixed and they in turn are repaid out of the Freight Rebates Fund.

The Railway Rates Tribunal is charged with the duty of reviewing each year the operation of the scheme, and in so doing is authorised to make alterations in certain circumstances of the rates of rebates. For the purpose of the review, statements are submitted to the tribunal showing the position of the fund at the end of the financial year, traffics which passed during the previous financial year, and the estimate of the rate of relief for the ensuing year, and evidence is produced before the tribunal as to the volumes of the rebateable traffic likely to pass during the ensuing year. With these statements and the evidence given before it the tribunal determines whether the existing rates of rebates are to stand or are to be readjusted. If at the end of any financial year there is a deficiency in the fund, not caused by any adjustments made in the fund in respect of over or under payments made into the fund to which reference is made below, that deficiency has to be met as to 50 per cent. thereof out of the contingency fund and as to the other 50 per cent. by the railway companies. Payments into the fund are made as already stated on estimates, but as soon as the actual rate relief of a company has been ascertained and it is found that there has been either an over or an under payment into the fund by that company then an adjustment has to be made, either by the fund repaying to that company what it has paid in excess of the estimate, or where there has been an under estimate the company has to pay into the fund the equivalent to the under estimate. These payments out of or into the fund are not taken into account in the calculations of any deficiency of which the railway companies have to bear half.

Since April 1, 1931, the railway companies have paid into the fund rate relief on the basis of existing assessments, but in the statements lodged with each annual review the railway companies have emphasised their view that when their assessments are finally fixed under the Railways (Valuation for Rating) Act, 1930, it will be found that the provisional payments for rate relief will be reduced by at least 50 per cent. If therefore the assessments when finally ascertained are substantially lower than the existing assessments (the new assessments are retroactive from April 1, 1931) it will be necessary to make large adjustments in the fund inasmuch as it will owe to the railway companies large sums in respect of the over payments made into the fund since April 1, 1931.

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Canadian Pacific Railway

THE operations of the Canadian Pacific Railway Company for the year 1934 show an improvement in the balance available for transfer to profit and loss and surplus revenue account with an increase of $5,212,630 over the previous year. In addition to possessing one of the largest railway systems in private hands, the company owns and works steamships, hotels, telegraphs, a news service, and sleeping cars, and has large landed interests. Its main line from Montreal to Vancouver is 2,893 miles in length and, despite the gradual abandonment of certain lines which have ceased to be profitable or which provide virtually duplicate facilities, the company still operates the large total of 16,986 miles in Canada and controls a further 70 miles in that Dominion and some 3,883 miles in the U.S.A. In the Saskatchewan district 188 miles, and in the Alberta district 68 miles, bring the total of lines under construction up to 256 miles. During the past year railway operations have shown a distinct improvement; gross earnings are $11,273,266 up, while working expenses increased only $6,312,537, and thus left net earnings $4,960,729 to the good. Incidentally the working expenses this year include pension disbursements, and therefore for comparative purposes the 1933 figure shown in our table below has been revised. The major part of the 6·7 per cent. increase in working expenses was the result of additional maintenance, which was $4,380,832 higher than in 1933. The main locomotive and car repair shops were operated an average of approximately three more days a month than in 1933. Transportation expenses increased $1,958,764, but the ratio to gross earnings improved, being 36·3 per cent. as compared with 38·2 per cent. in the previous year. Some operating figures are compared in the accompanying table:—

	1934	1933
Mileage open	16,986	17,018
Train miles	34,453,837	33,241,003
Ton miles	10,026,441,098	9,353,117,592
Number of passengers	7,592,802	7,173,527
	$	$
Freight revenue ..	94,786,799	85,135,082
Passenger revenue ..	15,015,450	14,163,357
Gross earnings	125,542,955	114,269,688
Total working expenses	101,158,931	94,846,394
Net earnings	24,384,024	19,423,294

An improvement took place in the average freight train loading from 1,515 tons in 1933 to 1,525 tons in 1934, and in the gross ton miles per train hour from 23,849 in

1933 to 24,062 in 1934. The fuel consumption remained at the same level as in 1933, namely, 112 lb. per 1,000 gross ton miles.

Prominent among the many problems which Canadian railways are at present facing is that of the relations between the C.P.R. and the Canadian National Railways. Pursuant to the provisions of the Act of 1933 extensive joint studies have been carried out by the two companies with a view to effecting economies and providing for more remunerative operation. The total annual joint economy secured by the two companies from the measures put into effect up to the end of 1934 is estimated to be $1,220,510. The pooling of passenger train services, originally introduced in April, 1933, was extended in March, 1934, to include all the important competitive services between Quebec and Montreal, Montreal and Toronto, and Ottawa and Toronto. After extended negotiations an understanding was reached as to the general principles to be applied in arriving at agreements for the elimination of duplicate lines. Agreements have been concluded in respect of two of these cases, and others are now in course of preparation. At the forthcoming meeting of shareholders confirmation and approval will be asked for four agreements between the C.P.R. and C.N.R. made during the past year.

One of the agreements provides for giving the C.N.R. the right to use the C.P.R. line between Dorval and Windsor station, Montreal, in connection with the operation of the passenger pool trains between Montreal and Toronto. A sketch-map and details of these arrangements were given in THE RAILWAY GAZETTE of November 30 last. The second agreement covers the amalgamation of the freight and passenger facilities and staffs of both companies at Fredericton, New Brunswick, where, since the beginning of 1934, all traffic has been handled by a joint staff using C.N.R. freight facilities and the C.P.R. passenger station; the cost of freight operation is divided on a tonnage basis, and each company bears one-half of the cost of passenger operations. The third agreement provides for the C.N.R. to abandon the working of the line of the Stanstead, Shefford and Chambly Railroad Company between Iberville and Farnham in Quebec, and to use jointly with the C.P.R. the latter company's line between these points, paying such amounts and contributing such proportion of the cost of operation and maintenance as will result in an equal division of the net economy resulting from the abandonment. Similar financial arrangements are envisaged in the fourth agreement, but here the C.P.R. is to abandon working the New Brunswick Railway Company's line between Cyr Junction and Edmundston in Quebec, and to have the joint use of the C.N.R. line between these points.

In an effort to give further effect to the provisions of the Act, the two companies prepared Bills authorising the amalgamation of their express and telegraph services. These Bills failed to secure the approval of Parliament, but negotiations have been continued in the hope that some means may be found of overcoming the difficulties in the way of effecting the desired economies in connection with these services. Despite the improvement in the results of the year's operations, the C.P.R. directors feel that in view of the necessity, under the present unstable financial conditions, of preserving the cash position of the company that they would not be justified in declaring any dividend in respect of 1934. From 1911 until 1930 inclusive the ordinary or common stock received dividends of 10 per cent., but in 1931 had to be content with 5 per cent., and in 1932 and 1933 received nothing. In 1932 only 2 per cent. was paid on the 4 per cent. preference stock, nearly all of this payment being chargeable to surplus, and for 1933 this stock received nothing.

Cost of Locomotive Repairs in U.S.A.

AN interesting paper entitled "Factors Affecting the Cost of Locomotive Repairs" was presented by Mr. Hubert J. Titus, at the annual meeting of the American Association for the Advancement of Science and associated societies, recently held at Pittsburgh. The author stated that although a large number of engines has been retired during recent years, there still remain some 50,000 steam locomotives in service on the railways of the United States. During the present abnormal conditions the total sums expended for maintaining the active locomotives are somewhat less than the $400,000,000 (£82,305,000) annually spent during normal times, but even under present conditions, with approximately $300,000,000 (£61,728,000) expended, the relationships of maintenance costs to the other direct operating expenses, which include fuel, wages, running shed costs and those of locomotive and train supplies, remains practically the same. For several years these items have constituted approximately 31 per cent. of all direct expenses of operation and occupy first place among the total of such disbursements. As these expenses affect not only the working but also the design of locomotives, studies have been undertaken to determine, if possible, a method whereby fairly accurate predictions can be made when considering some of the more important variable factors which influence these expenses. The greatest benefit to be derived from such a study is found in the analysis of the effects produced on the costs by each of the independent variables, as well as those presenting themselves when these variables act in combination with each other. As is well known, the miles between general repairs have a great influence on the total expenditure on maintenance as well as on that computed on a basis of cost per mile of operation, and if the power of a locomotive affects these expenses to any great degree, such a study will make possible the determination of the most economical mileage between general repairs for each class or group of locomotives.

With reference to the power of locomotives, the author said that the results vary according to the unit selected to represent power. In addition to the common units of tractive force and indicated horsepower, others that have been used are the potential horsepower based on boiler dimensions, together with the steam consumption rates of the cylinders and the piston thrust. A further unit in measuring power is represented by the forces imposed on the frames of the engine at the axle centres, and all these units could be developed to give an approximation of the power and the total work done by the locomotive. In such a study one is faced with the selection of a unit representative of the power of the locomotive which will bear some relation to the work it does, and naturally the best unit in this connection would be the ft. lb. of work done, or the total drawbar horsepower expended. Such units are, however, not generally available, and furthermore it is impracticable to obtain them from everyday operation. It thus becomes necessary to adopt a unit which will indirectly measure the work done, as for instance the total amount of fuel consumed, total evaporation of the boiler, the weight on the coupled wheels, and possibly the total weight of the locomotive itself. Considering these factors in conjunction with those already mentioned, it should be possible to arrive at a definite conclusion as to the most suitable unit for expressing power in relation to maintenance expense.

The author's main purpose was to present a method of analysing data obtained from general experience in operating and maintaining locomotives. After detailing the particulars of this method, he went on to say that the results to be obtained lead to the conclusion that the

maintenance expense of locomotives can be predicted, at least within limits, and that, furthermore, a knowledge of the effect of the variables of miles between general repairs and miles per month makes it possible to estimate the real influence of power and age on the cost of locomotive maintenance. This knowledge should not only make it possible to determine in advance the results obtainable with new locomotives, but should also assist in arriving at the most effective means of reducing the maintenance expenses of existing engines, as well as making it possible to ascertain when they will become uneconomical for specific operations. Only through a complete analysis along these lines is it possible, in his view, to reach the ultimate goal of minimum expenses for maintaining steam locomotives.

* * * *

Main Line Electrification Experience

IN an article contributed by Sir Herbert Walker to a supplement called "Electricity" published by *The Financial News* last Monday, he pointed out that, while there are few more thorny and controversial subjects than that of railway electrification, any scheme must define clearly and specifically the conditions necessary for its success, so that previous experience in similar circumstances might be analysed. Traffic and other conditions varied so greatly in different localities that the success, for example, of the Brighton main line electrification could not be used as an argument to justify general main line conversion. Electric traction on the Southern Railway *increased* operating costs, and its great outlay was justified solely if it would so improve services as to increase *gross receipts*. A favourable circumstance on the Brighton line which would not necessarily apply elsewhere was the abnormally good actual and potential slack hour traffic, in addition to rush hour peak loads. In 1934 the Southern Railway gross receipts from electrified passenger services were £6,211,374, an estimated increase of more than £1,850,000 over steam working. After allowing for repairs and track and rolling stock maintenance, working expenses were some £164,000 higher. Nevertheless, gross receipts remained about £1,680,000 to the good, and this was the justification for electrification in the special circumstances obtaining on the Southern Railway, which would apply even had the £12,000,000 outlay been all charged to capital account; actually only about £5,000,000 was so charged, and rolling stock renewals funds were able to bear an approximately similar amount by regarding new electric rolling stock as ordinary replacement.

LETTERS TO THE EDITOR

(*The Editor is not responsible for the opinions of correspondents*)

High Speed Steadiness

"Endsleigh," 9, Strathearn Road,
Edinburgh, March 20

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I am interested in Mr. Macdonald's observations regarding the steadiness of trains running at abnormally high speeds, having been for many years engaged in studying records from my own and other track recording machines. I do not think there is any analogy with bullets or other projectiles which derive their steadiness from well known dynamic principles. Train oscillations are a result of the interaction of rolling stock and track, irregularities in the one producing oscillating motion in the other and *vice versa*. The point lies in the latter, and as I pointed out in an article in THE RAILWAY GAZETTE of May 27, 1932, I have some definite evidence of track distortion which must have been caused by the normal inherent action of the rolling stock. The phenomena of resonance and tuning are such commonplaces nowadays that it is hardly necessary to recall that vibrations will be more pronounced when their two origins are in step. I think it is at least a feasible theory that the test train steadied down at 80 to 108 m.p.h. because the track irregularities were out of step at that unusual speed. The point I would like to emphasise is the danger of jumping to the conclusion that running will always be steady at such high speeds. I think it is more likely that, if such speeds became normal, the track deformities would sooner or later follow suit and the oscillation would re-assert itself in much the same form as before.

Yours faithfully,

REGINALD PETERS

Speed and Curves

217, Gary Avenue, Wheaton,
Illinois, March 16

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Mr. Norman D. Macdonald, in his letter published in THE RAILWAY GAZETTE of January 4, refers to 12 in. of superelevation on a certain American railway curve, but I think his memory must be at fault. I doubt if any curve was ever put up to such an extent, especially as slow freight and fast passenger trains have to be run on the same line of rails. In the old rules of the New York Central the maximum permissible was 7 in. and on the Pennsylvania it is 6 in. In the revised table of curve superelevation proposed by the American Railway Engineering Association, in view of the evident trend to higher speeds, the maximum for speeds over 50 m.p.h. is 8½ in. for 55 m.p.h. on 5 degree curves and for 100 m.p.h. on 1½ degree curves. (1,146 and 3,800 ft. radius respectively.) Where only high speeds are considered and track conditions permit, the maximum is 9 in. for the same curves and speeds, except 110 m.p.h. for 1½ degree curves.

I agree with your footnote to the letter on page 323 of your issue of February 22 in connection with the articles on "The Mechanics of a Locomotive on Curved Track." You are quite right as to the impracticability of including wind resistance as a factor. The analysis is already so academic, in view of the innumerable variations in actual service, that to include the wind resistance would render the investigation simply a matter of "mathematical fireworks" of no practical value.

I look forward with interest to further articles on railway engineering which the amalgamation of *The Railway Engineer* with THE RAILWAY GAZETTE promises.

Yours very truly,

E. E. R. TRATMAN

SOUTH AFRICAN EMPIRE EXHIBITION.—Energetic preparations are already being made, both in the United Kingdom and in South Africa, for the first Empire Exhibition to be held since Wembley. Over 100 acres have been secured as an excellent site for it at Johannesburg, the principal trade centre of South Africa. It will open in the autumn of 1936, and is being sponsored by the Federation of British Industries. A London Advisory Committee has been formed under the chairmanship of Sir Arthur Balfour. Among the eight industrial sections of the exhibition will be one for heavy machinery, mining, and engineering. The influx of visitors and exhibits from all parts of the world will provide the South African Railways with an abundance of traffic over the long leads between the ports and Johannesburg. Particulars on all matters connected with the exhibition can be obtained at 21, Tothill Street, S.W.1.

PUBLICATIONS RECEIVED

The British Isles.—To run through the pages of the new edition of the booklet bearing this title issued by the Travel and Industrial Development Association of Great Britain and Ireland should be sufficient to make even the most reticent of Englishmen burst into some sort of a *gaudeamus*. What other country can boast within so comparatively few square miles such glories as royal Windsor, the tradition-bound "High" at Oxford, the great cathedrals of Canterbury and York, the beauties of the Lake District, the ruggedness of Wales, the awful grandeur of the Highlands, and the serenity of the glens of Antrim, or even the grim (or grimy!) majesty of London? "The British Isles" is published free, expressly for the purpose of reminding the tourist of this fact, and its pleasing arrangement of photographs and text should certainly succeed in attracting in this Jubilee year yet more visitors to these islands.

Report on the Treatment of Welded Structures by the Metallic Arc Process. London: The Institution of Structural Engineers, 10, Upper Belgrave Street, S.W.1. 8½ in. × 5½ in. 166 pp. Illustrated. Price 5s. 0d.—This report has been prepared by the Steelwork Welding Panel on the following terms of reference:—

(1) To collect references to existing work.
(2) To investigate and report on metal arc welding and welded joints.
(3) To recommend (*a*) a working factor of safety for welded joints; (*b*) methods of design for welded joints; (*c*) methods of supervision during construction, and (*d*) methods for carrying out field tests.
(4) To formulate recommendations for the control of the construction of welded steel structures.

The report is divided into four parts. The first is a critical review of metallic arc welding. The underlying theory is outlined and brief reference made to current supply and regulation. A discussion of welding procedure is followed by an instructive review of the possibilities of standardised technique, with hints on the avoidance of distortion.

Part 2 is a study of some metallurgical aspects of welding. It deals with the choice of electrodes, the preparation of joints, workmanship, and (briefly) with the effect of corrosion on both stressed and unstressed welds. It is profusely illustrated by enlarged photographs of typical weld bead formations, by macro- and micro-photographs of butt and fillet welds, together with X-ray photographs. The preparation of all these has involved labour, such as will be fully appreciated only by those to whom such work is familiar. The task of presenting and reviewing this mass of information has proved too much for the editors. Even to ourselves, as interested parties, the paucity of explanation is apparent. We were obliged to explore the text and illustrations seriatim and to do a certain amount of cross-referencing. If the report is intended for the information of structural engineers who may not yet fully appreciate the nature of fusion welding, then this section of it will probably be labour lost. For instance, in sub-section 7 on Alloy Electrodes, the table of chemical and mechanical properties of deposited metal will probably convey more to them than the 43 really excellent photographs which accompany it.

Part 3 describes the experimental work carried out by the panel in making comparative destruction tests of a welded and a riveted roof truss, a welded and a riveted plate girder, and an all-welded stanchion. Some interesting facts emerge regarding the effective section moduli of welded and riveted girders, and their respective weights.

Part 4 contains recommendations for the design of welded joints and incorporates sections (*a*), (*b*) and (*c*) of item 3 of the terms of reference. It was found impossible to recommend any method of carrying out field tests of welded joints. The report nevertheless makes it quite clear that correct procedure control together with adequate inspection is quite sufficient to ensure sound welding of ordinary structural joints. This should do much to assist those who have hitherto been influenced by ill-informed opinion regarding the "human factor" in fusion welding.

This report, which is to be followed by others, is an interesting symposium, but to welding engineers it brings little that is new. It is to be hoped that other structural engineers will give it the patient scrutiny which it so well deserves.

G.W.R. Rational Distribution.—One of a number of ways in which the G.W.R. can save a business man money is clearly indicated in an attractive four-page illustrated folder issued from Paddington station. "Warehouse in bulk—Distribute in detail" is the "note" of the scheme, which ensures that one's factory can be at a customer's door if stocks are kept in a local G.W.R. warehouse, order and delivery being given almost simultaneously. It is claimed that the charge is much less than the total of overhead and running expenses involved in the maintenance of one's own accommodation—it constitutes, in fact, the cheapest form of storage known.

Locomotives of the L.N.E.R. Past and Present. London, 1935: The Locomotive Publishing Co. Ltd., 3, Amen Corner, Paternoster Row, E.C.4. 8½ in. × 5¼ in. 50 pages. Price 1s.—Despite its critics and those who would displace it by other less live and inspiring modes of rail traction, the orthodox steam locomotive retains and increases its circle of friends and admirers, and any work giving particulars, if only of the numbers and names of certain classes, is assured of a ready support. The re-issue of the booklet now before us, which is published under the authority of the L.N.E.R., has been looked forward to by L.N.E.R. locomotive students for many a month past. The complete list of named locomotives and their types forms but a small section of the booklet, and the rest is devoted principally to a description of locomotive development on the former separate railways, now part of the grouped L.N.E.R. system, and the later designs introduced by Mr. H. N. Gresley for the system as a whole. Numerous illustrations of old and new types are interspersed in the text, and the principal dimensions of the later engines are included in the descriptive matter. A dimensioned line diagram of three-cylinder 2-8-2 express locomotive No. 2002, *Earl Marischal*, is given on page 46, and the cover design is an excellent reproduction in colour of a painting by Mr. Secretan of No. 2001, *Cock o' the North*.

A Self-Oiling Pulley.—Hadfields Limited, of Sheffield, sends a leaflet illustrating a new rope-haulage pulley for use in quarries, mines, and similar situations, which incorporates an automatic lubricating system. The lubricant is housed in a reservoir surrounding the hub, and rises under the influence of centrifugal force until a small quantity reaches the level of a duct communicating with the spindle. Economy is ensured by the fact that the system operates only when the pulley is in motion. Lubrication is equally effective whether the unit is mounted with its axis in a vertical or horizontal position.

Mercury Arc Rectifiers.—The Electrical Equipment & Carbon Co. Ltd., 107-109-111, New Oxford Street, W.C.1, has published an illustrated folder showing typical commercial applications of Nevel mercury arc rectifiers. Features of this type of rectification are a perfectly smooth direct current output combined with complete silence. Among the installations illustrated is one at a railway sub-station in Liverpool, comprising two 115-kW 250-volt bulbs dealing with 500 amperes continuously. The rated characteristics permit of this rectifier handling an overload of 25 per cent. for two hours, and of 50 per cent. for 30 minutes.

Self-Aligning Roller Bearings.—The Fischer Bearings Company, 85-87, Milton Street, E.C.2, sends a catalogue of self-aligning single and double-row spherical roller bearings for heavy duties. Self-alignment in all directions is a feature of the double as well as of the single-row type, to which are added the valuable characteristics of a compact design which economises in lubricant and a very high carrying capacity. Many examples of industrial machinery to which Fischer bearings have been applied are illustrated, among them two applications on the German State Railway. One of these is in the axleboxes and transmission of an internal-combustion shunting locomotive and the other to the pulleys of a lift bridge over the River Peene at Karnin.

THE SCRAP HEAP

A ticket recently issued by the Canadian National Railways measured six and a half feet and is said to be the longest ever issued by the company. It was issued to Miss Edna Jacques, who is making a lecture tour of Western Canada. Each stopping place necessitates a fresh coupon.

* * *

HOW IT'S DONE

The paragraph on this page of last week's issue as to B.B.C. sound effects has inspired a reader to send us the following:—

When you listen on the wireless to a railway episode
You'll surely get a thrill (or p'r'aps a fright),
As you hear, and almost visualise, the massive steely form
Of a giant loco. thund'ring through the night.
But things are seldom what they seem, and here's a case in point:
That roaring loco.'s just a clever prank—
A "sound" effect by means of which a simple roller skate
Is propelled by measured hand work in a tank!

* * *

It was scarcely to be expected that the landslips and floods occurring at Folkestone would affect Peckham, but this seems to have been the case. I learn that Mr. Tilling, the extensive jobmaster of South London, has entered into arrangements with South Eastern Railway Company, to horse several four-horse coaches to run between Folkestone and Dover. The first number of horses left Charing Cross at 6 a.m. on Thursday, and others left the same evening.—*Extract from the "South London Press" of January* 20, 1877.

[A severe storm washed away the foot of the cliff at the southern end of the Martello tower, and some 60,000 cubic yards of chalk fell. Three men were killed. The line was closed from January 12 to March 12, 1877, when a single line was reopened. Double line working was resumed on May 30 of that year.]

* * *

Baby, as well as the household pets—the dog, the cat and the bird—now share in the reductions in rates consequent upon the Pennsylvania Railroad's new baggage tariff. The cost to owners for carrying dogs, cats, or birds has been cut by a half, while baby will now be able to take with him or her free of charge baby carriages, go-carts, play-pens, cribs, velocipedes, and tricycles. That is providing, of course, that baby is travelling with a parent or guardian who has a ticket. Outdoor enthusiasts travelling on the Pennsylvania have equal privileges afforded their bicycles, toboggans, snow shoes, sleighs, steamer chairs, camping outfits, and other sports paraphernalia.

* * *

Milestones were apt to disappear from the Central Indian Railway. Again and again they were dug up and erected in the temples of near-by villages. At length, on the advice of a Brahmin, the railway authorities smeared the milestones with the sacred vermilion which the Hindoo will not dare to touch. The milestones are never disturbed now, but processions of pilgrims frequently approach a particularly large milestone, anoint it with oil, and pray to it.—*From "Loafing Round the Globe" by Herr Richard Katz.*

* * *

We are indebted to our American contemporary, *The Model Craftsman*, for the accompanying following notes on the locomotive illustrated from an old engraving, which was the first coal-burning engine on the Hudson River Railroad, now merged in the New York Central system:—

Though industrial plants had been burning coal for many years, the adoption of this fuel by American railroads was long delayed by the opposition of the residents along the line, and also by the towns through which the engines ran. There was also a very considerable amount of conservatism to be overcome among the designing engineers of the roads themselves, as they had discovered that the hard cinders made by coal wore out the soft copper flues then in use. It was maintained that the steel flue, made necessary by the use of coal, would not conduct heat readily to the water, thus requiring larger and heavier boilers. Finally, after these objections were overcome, the use of coal on railroads became general, but the engines which burned this fuel were regarded as a nuisance for many years after wood burners had disappeared from the rails. In those days, it was customary for a train with a wood-burning engine to pull into a side track, while waiting for another train to pass, and let the fire die down, as there was plenty of time to blow it up again, after the smoke of the meeting train was sighted. This restful method of railroading was not possible with a coal-fired engine, and the crews naturally resented an innovation which interfered with what they had come to regard as their rightful leisure. In the locomotive *Irvington* it will be noticed that all the characteristics of the wood burner have been retained—the huge stack and dome, the crosshead-driven feed pumps, and the handwheel-controlled wooden brakes on the tender trucks, which often were the only means of stopping freight trains, as the crews did not have the time to set many car brakes in emergencies, air being unknown as an actuating medium.

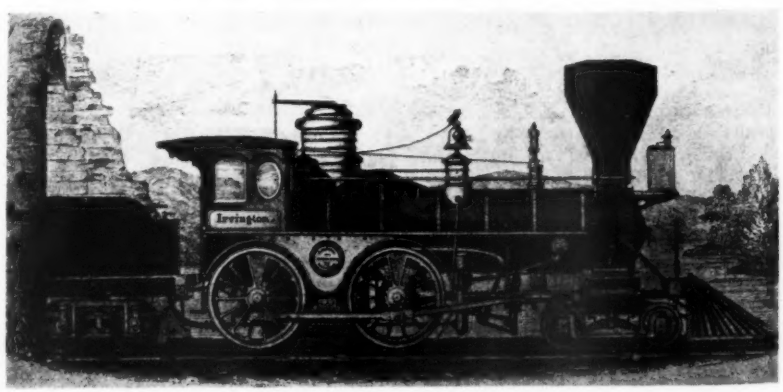
* * *

AVE ATQUE VALE

Last year 5,991,701 persons bought platform tickets at Southern Railway stations. This was an increase of 169,528 over the previous year. London terminal stations, of course, headed the list, with Victoria well to the front with 785,601 tickets sold. Waterloo came next with 622,522. In the provinces, Brighton led with 198,966, closely followed by Southampton West with 197,136.

* * *

Constable Pickrell, of the Canadian National Railways police, who was born in Kings Lynn, Norfolk, has held every Canadian revolver and pistol shooting trophy since 1927, besides having at one time or another won every United States trophy for the same sport. He has taken nearly every Canadian revolver and pistol trophy out of existence by virtue of consecutive wins—and has given them all back for further competition. Until the armistice in 1918 he had never fired either of these weapons. After the war he took up commercial flying in Northern Ontario and Manitoba, but his boyhood's desire overcame him and he joined the Canadian National Railways police force. In view of the interest taken in revolver shooting among the police at Winnipeg, Constable Pickrell decided to try it himself, and as a result of hard practice he has become the outstanding pistol and revolver shot of the North American continent.



The first coal-burning locomotive on the Hudson River Railroad

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

ARGENTINA

Summer Train Services

An oppressively hot if belated summer has been responsible for an abnormal passenger rush to the hill, seaside and lake resorts during January and February, for which the railways have made special efforts to cater by speeding up their timings and running additional fast expresses and frequent cheap excursions.

Central Argentine Railway

On the Central Argentine Railway, an important acceleration, which has been greatly appreciated by the business community and the travelling public generally, is the reduction in timing of the Buenos Aires—Rosario express, known as the Rápido, from 4¼ to 4 hr. for the distance of 187 miles. This train—the fastest in South America—now leaves Rosario every day (except Sundays) at 9 a.m., arriving at Retiro at 1 p.m. On Sundays the hour of departure from Rosario is 8.45 a.m., to allow of stops at San Nicolás, Ramallo, San Pedro, Baradero and Campana, arriving at Buenos Aires (Retiro) at 1 p.m. The Rápido now leaves Retiro every day (except Sundays) at 7 p.m., arriving at Rosario at 11 p.m. On Sundays the hour of departure from Retiro is 8.15 p.m., making the intermediate stops already mentioned, and the train arrives at Rosario at 12.50 a.m. on Monday. On Sundays another train (non-stop), with the same timetable as the Rápido, leaves Retiro at 7 p.m., arriving at Rosario at 11 p.m.

Second Class Excursions

The company has also given special attention to developing and accelerating its services to the Cordoba hills, the passenger movement to which has showed a pronounced increase this summer, and is about 30 per cent. higher than that registered last year. In addition to running two fast expresses daily in both directions, equipped with dining and sleeping cars, and working in agreement with the State Railway for journeys to the higher hills, the company is also running frequent cheap daylight and night excursions, the daylight trains being equipped with a restaurant car service for both first and second class; the availability of the tickets is made as elastic and convenient as possible. In combination with some of these excursions, combined "all-in" rail and hotel tickets, inclusive of motor-car trips, are issued by the tourist agencies. The company has broken new ground recently in this direction by running second class daylight dining car excursions from Buenos Aires to Cordoba, at the extremely low rate of $15·00 return. The popularity of this innovation is demonstrated by the fact that all the tickets (limited to 1,000) issued for one of these trains were disposed of shortly after being put on sale, and the train had to be run in two sections in order to accommodate 800 additional passengers who had applied for tickets.

B.A. Great Southern Railway

This railway has as usual had to deal with a heavy passenger traffic to the seaside resorts, Mar del Plata, Miramar and Necochea, in addition to the inland holiday resorts, Tandil and Carhue (Lake Epecuen) and the southern lakes. During the summer season there are two trains every day to Mar del Plata from Buenos Aires, one of which—a fast express (which does not run on Sundays) equipped with Pullman, first class saloon and dining cars—covers the distance of 251 miles in six hours. On several occasions this summer this train has had to be run in two or more parts. There is an additional train every Friday evening during the season. The company is also running cheap daylight restaurant car excursions to Mar del Plata from Buenos Aires, the timetable allowing about 9 hr. at the seaside. The first class return fare for these excursions is $15.

Southern Lakes Service

With the railhead of the State Railway branch line now between Pilcaniyeu and Bariloche, at the head of Lake Nahuel Huapi (as mentioned in THE RAILWAY GAZETTE of June 22, 1934), it is possible to travel through from Buenos Aires with comfortable sleeping accommodation, a facility which has been enjoyed this summer by large numbers of tourists to the southern lakes. The Bariloche express leaves Buenos Aires (Plaza Constitución) on Mondays and Fridays at 6.35 p.m., arriving at Bahia Blanca on Tuesdays and Saturdays at 5.55 a.m., and at Bariloche on Sundays and Wednesdays at 10 a.m. The return from Bariloche is made on Sundays and Wednesdays at 6 p.m., arriving at Bahia Blanca on Mondays and Thursdays at 9.35 p.m., and at Buenos Aires on Tuesdays and Fridays at 9.45 a.m. The ordinary train leaves Buenos Aires at 6.35 p.m. on Tuesdays for Bariloche, arriving there at 6.30 p.m. on Thursdays, and returning on Fridays at 10 a.m., arriving at Buenos Aires at 9.45 a.m. on Sundays.

B.A. & Pacific Railway

The B.A. & Pacific Railway is organising another of its train cruises to the Andine provinces, leaving Buenos Aires on March 2 and returning on the 10th. The train will be equipped on similar lines to that described in THE RAILWAY GAZETTE of December 21, 1934, and the itinerary will embrace visits to San Rafael, Mendoza, Uspallata, Puente del Inca, Cristo de los Andes, Valle de los Horcones, Yacanto and Mina Clavero, with motorcar trips to places of interest off the railway. The price of the tickets is $350·00 for adults and $270·00 for children. The number of passengers is limited to 70.

BRAZIL

Gauge Conversion on the Paulista Railway

The conversion of the line from Itirapina (on the main Campinas-São Carlos route) to Baurú and Agudos from metre to 5 ft. 3 in. gauge is proceeding rapidly; the new track is already laid as far as Dous Corregos, 86 km. from Itirapina, and it is hoped that the entire work, including the construction of a spur line *viâ* Jahú, will be completed before the end of the present year.

New Rio Grande do Sul Railcar Services

In order to improve the train service between Porto Alegre and various hill resorts during the summer and relieve the existing steam trains which, in the height of the season, are invariably overcrowded, especially on Saturdays, the administration of the above railway decided to introduce railcars on the Canella and Caxias branches, these being the two principal routes for excursion traffic. The vehicles in question, which are up-to-date in every respect, seat 24 passengers, and the fares charged are the same as by the steam trains. The fastest bookings from Porto Alegre to Canella and Caxias by railcar, including stops at the more important stations *en route*, are 4 hr. 5 min. and 4 hr. 47 min. respectively, giving averages for the 149 and 194 km. of 36·5 and 40 km.p.h.; timings in the reverse direction vary little from the above, and the schedules quoted are, respectively, 2 hr. 46 min. and 2 hr. 16 min. less than the fastest hitherto in force.

Oldest Locomotive in Brazil on Tour

The first locomotive in Brazil, *Baroneza*, which, as recorded in THE RAILWAY GAZETTE of August 31, 1934, was a feature of the Rio International Samples Fair, is now to proceed at the beginning of April on an extensive tour. Starting from Dom Pedro II, the terminus of the Central Railway, *Baroneza*, together with the two specially constructed coaches, copies of those used on the Estrada de Ferro-Grão-Pará in 1854, *Baroneza* will run over the Central, the São Paulo, Paulista and São Paulo-Rio Grande Railways. Travelling on this remarkable journey will be members of the Rio Municipal Council of Tourism, engineers of the Central Railway, a technical assistant

of the Transport Minister and representatives of the Press, and at various stations bronze tablets will be affixed in commemoration of the enterprise of Barão de Mauá, who first introduced railways to Brazil.

Ceará Railway Financial Results in 1934

For the past year the working of the above Federal railway gave the following results:—

Gross receipts ...	...	9,880 contos
Expenditure ...	...	8,460 ,,
Net receipts ...	...	1,420 ,,
Operating ratio	...	85·6 per cent.

The General Manager of the railway, Dr. Ulpiano Barros, reports that this is the best year's working recorded up to the present, notwithstanding salary and wages adjustments which came into force on August 1.

SPAIN

Conversion of Silla-Cullera Line

This 26-km. metre gauge line was acquired some years ago by the Northern of Spain Company, and has now been converted to standard gauge (5 ft. 6 in.). The conversion was inaugurated on March 1 with appropriate ceremony, a special train running from Valencia with the local authorities was received by the Chairman of the Northern Company, the Marques de Alonso Martinez, and other officials. The Ribera district will now be placed within fifty minutes of Valencia, and the change of train and wait at Silla is abolished.

Cartagena-Herrerias Steam Tramway Company

This British company, in consequence of the stoppage of the Cartagena iron mines, and the intensive road competition, suspended the traffic on its 16-km. line some two or three years ago. The Government, however, continued to work it, the losses being made up in part by the local interests. As the traffic has continued to diminish, the Government has announced, by a Ministerial Order published in the *Madrid Gazette* of March 7, its intention to close the line.

Proposed Issue of Debentures

The Northern of Spain and the Madrid, Saragossa and Alicante Companies have asked the Government to authorise the issue of special debentures to the amount of 200 millions of pesetas (£5,800,000) backed by a State guarantee. Under the Spanish Railway Statute of 1924, new works and betterments must be paid for out of the Railway Fund, but of recent years successive Governments have sought to reduce the outlay under this head. On the other hand, the concessions held by the two companies are within something like 30 years of the termination of their 99 years of life, a period which is insufficient to allow for the total redemption of any considerable issue of bonds. Hence the period of the leases must have the backing of the State. The companies have made it clear in their petition that such an issue, made at the present time, will assist considerably in meeting the unemployment problem, as the greater part of the money will be spent in the country and within a very short period.

SOUTH AFRICA

The Budget

Mr. O. Pirow, Minister of Railways and Harbours, in introducing his railway budget, of necessity anticipated the results at the end of the financial year, as, at present, actual results in respect of the first nine months only are available.* The expenditure, estimated at £27,498,637, exclusive of special appropriations totalling £779,645, will probably be exceeded by £801,105. The expenditure estimate as revised now stands at £28,299,742. The revenue, estimated at £27,759,590, will probably be more by £3,588,155, making a total revenue of £31,347,745, a surplus of £3,048,003 for the year. Deducting the accumulated deficit of £2,168,269, there remains a net surplus of £879,734. The surplus includes an amount of £189,357 representing profit realised on the sale of some of the stock investments of the administration: the net actual result of working the railways and harbours during the year should therefore be £2,858,646.

It is proposed to appropriate the surplus towards writing out of capital account the value (£699,645) of dead assets at harbours, and for a special contribution of £100,000 to the rolling stock section of the renewals fund to make good in part the depreciation not provided for in previous years. The balance of the surplus will be carried forward to next year.

Benefits to the Staff and Public

During the year staff economy measures necessitated during the depression have been withdrawn to the extent of £941,731, and improvements in conditions of service have benefited the staff to the tune of a further £388,400. In the ensuing financial year still further indirect benefits will accrue to the staff from payments out of revenue totalling £900,000, of which amount £500,000 will be placed to a wages stabilisation fund, and £100,000 to a widows and orphans pension fund; an increased contribution of £200,000 will be made to the deficiency in pension and superannuation funds and additions and improvements to staff quarters will account for £100,000.

The direct and indirect benefits accruing to the public out of revenue approximate £921,000. Important tariff reductions, including free travel for children up to seven years of age, and half fares from seven to sixteen years; the cancellation of the surcharge of 10d. a ton on local consumption coal; and general tariff reductions resulting from the revision of the Mocambique Convention, account for £271,000. Other measures indirectly benefiting the public are a contribution of £500,000 to the rates equalisation fund, which fund is again being built up, and the provision of £100,000 for the more adequate protection of level crossings.

Electrification

Dealing with the question of electrification, the Minister said that consideration was at present being given to the subject of electrifying the lines in the Witwatersrand area, development here being such that it would be necessary to consider schemes of great magnitude in order to cope with the ever-increasing traffic difficulties. The question whether the lines should be electrified or not would be decided by the financial aspect of the matter. During the year the electrification of the Diamana-Harrismith section, and also of the Cape Flats line, was completed, and it was anticipated that the completion of the electrification of the line from Durban to Volksrust would be effected by 1936.

Estimates for 1935-36

The estimates for the year 1935-36 provide for a surplus of £44,067. Total revenue is estimated at £30,806,950 and expenditure at £30,762,883. These totals are made up of:—

	Revenue	Expenditure
	£	£
Railways	27,676,000	29,243,460
Subsidiary services ...	1,411,500	—
Harbours	1,579,500	1,328,004
Steamships	108,525	102,838
Airways	31,425	88,581
	30,806,950	30,762,883

MANCHUKUO

New Station for Dairen

A new station is to be constructed at Dairen for the South Manchuria Railway at a cost of Y. 3,000,000. Though it will have many Western characteristics, its appearance will bear the imprint of Manchurian ornamentation, which will also be noticeable in the furnishings. The station will be a three-storeyed building with large waiting rooms, grill room, ladies' lounge, barber's shop and public bathrooms and a number of shops. The traveller will be able to obtain all his requirements at the station, which will be equipped with almost everything but sleeping accommodation.

C.E.R. Retiring Allowances

The Chinese Eastern Railway—now the North Manchuria Railway—has paid over Y. 7,000,000 during the past three years in retiring allowances to approximately 2,500 employees. Retiring allowances to 1,000 former employees of the railway, amounting to

* An outline of the budget was published on page 352 in our issue of February 22.—Ed., R.G.

2,500,000 gold roubles, were paid in December last. Other retiring allowances to former employees which have been in abeyance for some years are now being considered.

Construction of Private Railways

To augment the railway system in Manchukuo and improve communications, encouragement is being given to the construction of private railways, some of which may become feeders to the main lines. The Department of Communications has authorised the construction of a light railway in the Chientao district, to be financed by private enterprise. The railway will be built between Tumen and Hunchun to carry the agricultural produce to the State Railways and to assist in the development of the district.

The Heiho Railway

The completion of the line from Peian to Heiho is now officially reported. This line has frequently been referred to in these columns, and is of considerable strategic and commercial importance, as it terminates on the Amur River opposite the city of Blagovestchensk.

ITALY

High Speed Steam Train Trials

Test runs with steam trains of the usual composition of expresses, but with a dynamometer car attached, and weighing about 200 tons, have been made between Milan and Venice for the purpose of noting the behaviour of the permanent way under traffic at high speeds. It is understood that between Verona and Padua one of the trains attained a speed of 148 km. (92 m.) p.h. The maximum speed permissible for ordinary traffic is at present 120 km. (74½ m.) p.h. It is to ascertain exactly what improvement in the permanent way is necessary that these test runs have been made, as with the institution of the new articulated streamlined diesel-electric trains under construction at the Breda works at Milan, the present speed limit will have to be increased to over 100 m.p.h.

French Railway Officers Present at Trial of Diesel-electric Railcar

The progress of the Italian constructors of railcars is being watched with considerable interest by other countries and, if one may judge by the achievements of the Italian ships and aeroplanes—for Italy holds the blue riband for the Atlantic passage and the world's flight record—it seems likely that the Duce's command " first on land, sea and in the air " will also soon be obeyed as regards railway speed. The visit of a number of prominent French railway officers to Domodossola on March 6 to inspect one of the new Breda diesel railcars, is a particularly interesting event, as the visitors came from a country pre-eminent in the construction of railcars. The party was composed of:—

M. Bichelonne of the Ministry of Public Works; M. Levy, Ingénieur en Chef attaché a la Direction, C. de f. d'Etat, accompanied by M. Garreau, one of his principal assistants; M. Tourneur, Chief of the Railcar Services of the P.L.M.; M. Monet of the C. de f. de l'Est; M. Legrand, Ingénieur en Chef de l'Office central d'Etudes de Materiel de C. de fer, and of a number of representatives of the principal manufacturers.

The party travelled from Domodossola to Milan in one of the new railcars at a speed of 120 km. (74½ m.) p.h. The car [which is of the type described and illustrated on pages 577-9 in the *Diesel Railway Traction Supplement* last week.—ED.] has a length of 20 m. (65 ft. 7 in.) and a seating capacity for 56. These streamlined cars have been designed by Signor Gornati of the Breda works, who was in charge of the control compartment during the run. A stop was made at Stresa, where the party was officially received by the Podestà (Mayor) and entertained to luncheon. Subsequently the car was thoroughly examined by the members of the party, and the trial run was then resumed to Milan and the neighbouring town of Sesto San Giovanni, where the Breda works are situated. The State Railways have 20 of these cars on order, and on the trial run of one of those already delivered, a speed of 162 km. (100·6 m.) p.h. was attained, as mentioned on page 471 in THE RAILWAY GAZETTE of March 8.

INDIA

Indian Railway Results

To enable the public to form a correct idea of the financial position of the railways, Sir Joseph Bhore, Member for Railways and Commerce, reviewed in his budget speech the results of railway working over the period of 12 years ending March 31, 1936. An analysis of this kind, spread over a lengthy period, eliminated the distorting effects of temporary causes. During these twelve years, six of prosperity and six of adversity, the net results of the working of all State-owned railways, commercial and strategic, would, if the budget estimates now presented proved correct, be a surplus of Rs. 14 crores (£10,500,000) and an accumulated balance in the depreciation fund of Rs. 41½ crores, or over £31 million. In other words, during this long period of varying fortunes, the Indian railways would have earned a net income of over a crore a year after meeting working expenses, providing for accruing depreciation and paying interest in full on borrowed capital.

Re-orientation of Railway Policy

Sir Joseph's budget speech endeavoured to remove a popular impression that, entrenched behind a position of considerable advantage, the railways resent all encroachments upon what they regard as their own peculiar sphere and refuse to advance with the times and forge effective weapons to meet attacks which modern developments have made possible. Sir Joseph said that whatever might have been the attitude of the railways in the past, he had no doubt that they were now fully alive to the need for a re-orientation of their administrative policy and methods. He had never lost an opportunity of impressing on those responsible for railway administration the necessity for such a change.

PERSIA

Persian Gulf—Teheran Transport

Railhead of the southern section of the new north to south Trans-Persian railway* is now at Salehabad or a short distance beyond that point, nearly 200 miles north of Bandar Shahpur the southern terminus on the Persian Gulf. Due to inadequate arrangements for landing and transporting cargo† at Bandar Shahpur, this port at present deals almost exclusively with Government material and stores, while general cargo practically all goes up the Shatt-el-Arab—the combined estuary of the Tigris and Euphrates—to Mohammerah. There it is either transferred to river craft which carries it up the Karun River to Ahwaz, whence it goes to Salehabad by rail and onwards by road, or it is carried by road throughout from Mohammerah to Teheran. The latter method of transport takes only five days as against 13 to 15 days by river, rail and road, but—according to *Economic Conditions in the Persian Gulf*, a report, dated October, 1934, published by the Department of Overseas Trade—it is 10 per cent. more costly than the combined methods.

SWITZERLAND

New Rolling Stock for Federal Railways

Following a meeting which took place in Berne on March 12, the Board of Administration of the Federal Railways has sanctioned the purchase of 45 new carriages, 12 luggage vans, and 50 goods trucks. By virtue of Art. 5 of the Federal Decree of December 1, 1934, dealing with means to combat the economic crisis and create possibilities of employment, the Federal Council will contribute Fr. 1,352,000 towards the expenses connected with the purchase of new rolling stock. Orders are to be placed at once for the construction of ten first and second class, and 30 third class coaches, all of which will be of all-steel construction intended for international circulation. The new bogie luggage vans are also to be built of steel.

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* Described on pages 530–31 in our issue of October 13, 1933, with map.—ED. *R.G.*

† Possibly due, as at Bandar Abbas and other Gulf ports, to steamers having to anchor some way out and discharge freight into country boats, always a slow and, in the monsoon, a risky business.—ED. *R.G.*

IMPRESSIONS OF OVERSEAS TRANSPORT

XV—A tour by rail, road and steamer in the South Island of New Zealand

By A. W. ARTHURTON, formerly Secretary, British Railways Press Bureau

IT is a great drawback to the railway system of New Zealand that the two islands are divided by a sea journey of nearly 12 hours' duration. Excellent through trains are run between Auckland and Wellington, a distance of about 500 miles, and the comfortable sleepers provided on the night trains enable one to arrive refreshed after a 14 hours' journey, but the steamer forming the connecting link with the South Island is by no means so rapid and another night journey of some 12 hours is necessary.

At Wellington, it will be remembered, the Duke of Gloucester on his recent visit laid the foundation of the new railway station* which will be a terminal worthy of the capital city and seat of Government. At present there are two wooden stations, Lambton and Thorndon, which have served as terminals since the very early days of the railways.

Leaving Wellington about 7.30 p.m. on the ss. *Aranura* we arrived at Nelson about 7 o'clock the following morning. The steamers between the north and south islands are commodious and well appointed, comparing favourably with our own cross-Channel boats. The three days' journey down the west coast to Mt. Cook or the Franz Josef and Fox Glaciers is one of extreme beauty and variety of bush and coast scenery. There are only short sections of railway in this region and most of the journey has to be made by service car. The first 80 miles is spent in climbing over the Hope Saddle to the Buller Gorge where the Hope River loses itself in the rushing waters of the Buller. The remaining 63 miles to Westport runs through the Buller Gorge, a constant succession of towering cliffs, cascades and wild woodlands.

The motor highways in Westland were fairly good though somewhat rough and dusty, as rain had not fallen for several weeks and most of the streams and rivers which are ordinarily rushing torrents were nearly dry. A great deal of work is being done in this area to improve the roads and provide needed employment. Dangerous corners, particularly on the cliff sides, are being widened and bridges strengthened or rebuilt. These works have already curtailed the time occupied on the journey by several hours and considerably improved access to the west coast resorts.

After spending the night at Westport we resumed our journey to Greymouth, another west coast port, along "a drive which is destined to be world famous." This claim is made with good reason, for the huge rollers of the Pacific breaking on the rocky shore are scarcely ever out of sight during the whole 68 miles. Throughout the whole of the west coast country are scattered gold mining towns and camps, which, now that gold has risen in price to over £7 an ounce, are dreaming of a return to the days of the gold rush in the 60's of last century. Hokitika, to which we travelled by train from Greymouth, was famous in the golden days. It now forms the extreme western point of the railway system whence one can travel completely across the island to Christchurch.

The third day of our journey was occupied in travelling, by service car once more, to the famous Franz Josef glacier, which comes down to within 700 ft. of sea level, as compared with an average altitude of 4,000 ft. in the terminal faces of European glaciers. Transport in the Southern Alps is neither easy nor fast. From the comfortable hotel at Waiho to the Hermitage, a tourist hostel near Mt. Cook, is 11 miles, but by the route over the glacier it involves three days' hard climbing, and by the road via Hokitika three long days' motoring.

One usually leaves the Franz Josef Glacier by the hundred-mile journey back to Hokitika and thence via the Otira Gorge and Arthur's Pass. For more than 60 years the Hokitika-Canterbury traverse has been one of the great scenic driving roads of the world, and it rightly deserves its fame. The great railway tunnel has diverted much traffic to the railway, but there are many who prefer to scale in a car the purple wall of the Alps. We also elected to travel over the Pass by car and join the railway at the other end of the tunnel, and were well repaid for our trouble. The summit of the Pass is 3,000 ft. above sea level. All about it are snowy peaks and the grassy slopes below were painted white and gold with alpine flowers.

The railway tunnel under the pass is remarkable both for its length (5¼ miles) and its straightness, as one can see through it from end to end. It connects Westland with Canterbury, entering the mountains in the Rolleston Valley, 1,586 ft. above sea level, and rises by a ruling gradient of 1 in 33 to an altitude of 2,435 ft. at the Canterbury end, emerging near Arthur's Pass station. The maximum width is 15 ft. and the height 16½ ft. Boring was a difficult achievement which had to be taken over by the New Zealand Government from the private firm which began it but could not continue. It took 15 years to complete and when the headings finally met they did so with a discrepancy of only 1⅛ in. in level and ¾ in. in alignment. The tunnel is electrified both for traction and lighting, and well ventilated, and has the distinction of being the longest railway tunnel in the British Empire.

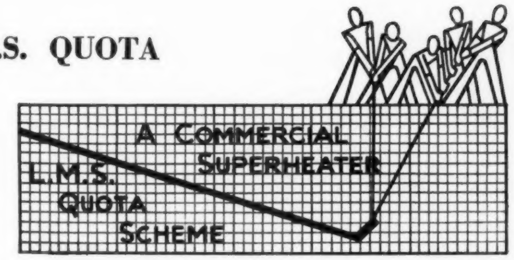
Except in the vicinity of the large towns where the track is double, the railways of New Zealand consist of single line, worked by tablet. The stations are numerous, but many in the country districts are little more than halts. Stops for refreshments are frequent. The guard walks through the train and announces "Seven minutes for refreshments at ——," and on arrival the passengers rush into the refreshment room and consume as much hot tea and sandwiches or cakes as they can in the time.

A hundred miles south of Christchurch is Dunedin, from which a 400-mile rail journey took us *en route* to Lake Wakatipu. At the railhead at Cromwell, resort was again had to the service car for the drive of 40 miles to Queenstown where, after spending the night, we embarked on the steamer to Paradise, a celebrated beauty spot at the head of the lake. The steamers on Lake Wakatipu are owned and run by the Railway Department and form the connecting link between the branch line to Cromwell and that from Kingston to the main line from Invercargill.

Joining the main line again at Gore Junction we reached Dunedin some 10 hours after starting from Queenstown. The following day was spent in travelling back by rail to Christchurch and embarking at Port Lyttelton on the *Rangatira*, a handsome vessel of 6,000 tons, which reached Wellington the next morning and thus completed our fortnight's tour of the South Island by rail, road and steamer.

* Described in THE RAILWAY GAZETTE of November 10, 1933.

REALISING THE L.M.S. QUOTA



Enterprise is encouraged and the interest of the staff in its work is kept alive by a scheme which turns the business of securing traffic into a competitive sport

REFERRING to the attitude of the public services, cynics have often said that those vast conjunctions of capital and labour have no soul. Literally, their statements are expressions of elementary truth, but in accepting such a view we must not obscure from our minds another truth, namely, that there exists a very great power of kindred quality which might be called the psychology of the mass mind. This collective potentiality is present in the personnel of every large aggregation of corporate labour, such as the railway services. But it can and probably will be latent unless it be encouraged and given an urge to respond to some kind of ideal or common cause.

It is insufficient to create an organisation merely to work within the boundaries of a circumscribed technique or code, no matter how efficiently its principles are applied by its servants. There must be individual enthusiasm, expressing itself competitively but recognising a collective pride of service. For as is written in the Book of books: "the letter killeth; but the spirit quickenth"; or, to apply this biblical phrase in a worldly sense, if enthusiasm be superimposed on obedience, a force of marvellous potentiality is at once released.

The keynote of the L.M.S.R. Company's commercial service, as reconstructed in 1932, is not only a desire to secure the business but to serve the public in the fullest possible sense, and to derive from such a policy the fruits that must ensue from its adequate fulfilment. The first question, therefore, which the L.M.S. management addressed to itself in considering upon what lines to construct its new commercial policy was, "what must be the cardinal features of our new plan?" The conclusions reached were briefly as follow:—

First, the services provided by the company should be of the highest possible character from the standpoints of efficiency, public appeal and variety.

Secondly, the goodwill and personal interest of every member of the staff should be enlisted to ensure the attainment of the first-named condition.

Thirdly, the parts of the organisation directly responsible for revenue earning should recognise and respond to a voluntary competitive *régime* as between individual salesmen, individual stations, and individual districts.

The third condition, which has come to be known in L.M.S. circles as the Quota, is remarkable in so far as it ingeniously applies in some measure to an open and widespread diffusion of labour, the stimulating force of rivalry amongst individuals, or groups of individuals. Egoism and the love of sport are, therefore, the unseen inducements which, through the game of quota hunting, impel every salesman on the L.M.S.R. to give of his best.

The reader will probably be interested to learn how the Quota scheme of traffic receipts has been successfully established and applied to commercialism on the L.M.S. Railway. First of all it was decided that it would be essential to measure the output of effort of individuals, such as canvassers, groups of individuals as represented by the staff of a station, and, finally, groups of stations forming the administrative regions of each District Manager. This measurement is naturally based on the results achieved during a past period, plussed by a percentage representing expected achievement; the percentage addition is determined by Headquarters after close and scientific study of all social, political or industrial factors which it is considered will directly or indirectly, favourably or unfavourably, affect the receipt-earning potentiality of the forward period.

Each section and type of traffic, *i.e.*, passengers, parcels, general merchandise, minerals, &c., has its own appropriate percentage addition applied to it, and whatever aggregate sum is required of the line in total is allotted to the various districts, stations and canvassers respectively in accordance with an expectation of their ability to secure the prescribed quota—*provided the requisite effort is forthcoming.*

It will be readily appreciated that in the fixation of the quota percentages,

LMS STATION ....

GOODS TRAIN TRAFFIC

QUOTA

PASSENGER TRAIN TRAFFIC

.... 193

	SUN.		MON.		TUES.		WED.		THUR.		FRI.		SAT.	
	GOODS	PASS.	GOODS	PASS.	GOODS	PASS.	GOODS	PASS.	GOODS	PASS.	GOODS	PASS.	GOODS	PASS.
Day's Quota														
,, Actual														
Cumulative Q.														
,, A.														
Day's Quota														
,, Actual														
Cumulative Q.														
,, A.														
Day's Quota														
,, Actual														
Cumulative Q.														
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Day's Quota														
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Cumulative Q.														
,, A.														
Day's Quota														
,, Actual														
Cumulative Q.														
,, A.														

The Quota calendar—a score board which shows every member of the station staff his district's daily progress

and the allotment of the burden, three outstanding features have to be reckoned with :—

(1) Normal seasonal variations.
(2) Displacements or increments of traffic due to abnormal causes.
(3) Trend of national affairs.

Under the first head, for example, in the case of passenger traffic the peak period of the year is from July to September, and it is during this time that super-salesmanship is most in evidence, though the effort itself may have been made months in advance. Consequently, the percentage of the quota to be secured from passenger business is heavier for the peak period than the remainder of the year.

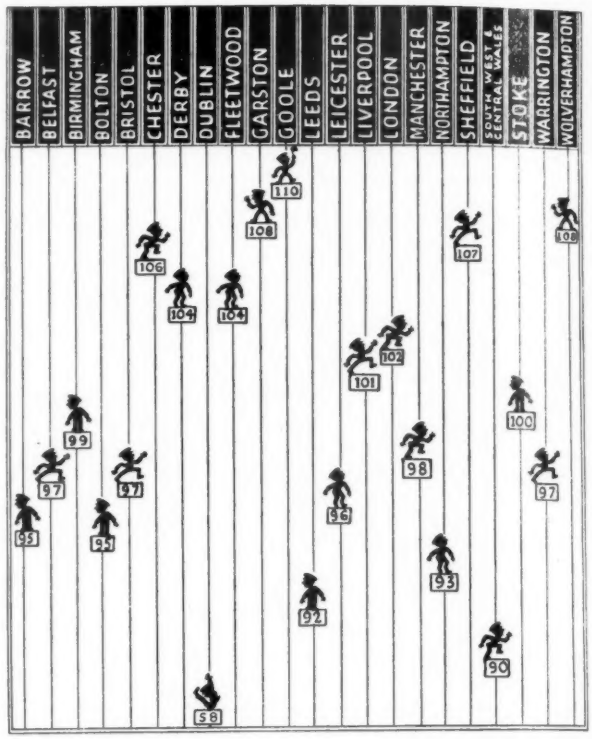
In the case of freight traffic, circumstances can arise which set up considerable disturbances in its flow. Tariffs or rationalisation in trade may virtually extinguish the flow of a given commodity in one district, and the compensatory production arises in entirely different areas. These disturbances in the basis period of the quota are duly taken into account, so that the broader backs take the heavier burden.

In due season when the periodic results are forthcoming, league tables are published containing the names of the stations or districts arranged in order of merit, the criterion upon which positions are determined being the *percentage* of quota secured. Experience has shown the necessity for grouping the stations with some regard to the dimensions of the business they normally handle; there are accordingly three leagues; the first includes the major cities and towns; the second the medium-sized places; and the third, the stations which have only small traffics. By this means extreme dissimilarity as between the stations in the matter of volume of business is avoided, and a keener interest engendered in the contest.

So far we have described the *immediate* objective of the L.M.S. Quota Scheme—in short, to secure a prescribed addition to the previous year's traffic. There is, however, an *ultimate* goal. No matter how admirable a series of annual successes would be, it was felt that the standard of measurement should be placed on a forward basis, and it has been decided that the level of gross receipts earned in the year 1929 should be adopted as an ultimate goal to be attained over a period of three years; " white " to move and win in three moves, so to speak.

This last condition is a recent amendment of the Quota Scheme as originally designed; it has the dual merit of establishing a visual winning post, and maintaining greater equity in the relative placing of the competing areas or individuals on the ladder of progress. Herewith is a ladder of progress which appears in the breezy periodical known as *Quota News*. This is the official organ of the L.M.S. commercial service which has been introduced to stimulate a more lively interest in results and to disseminate the bright ideas and successes, with the hope that they may receive the flattery of imitation by the staff in general.

No true-born Britisher can gaze on a picture like this and remain unmoved. Either one of his waistcoat buttons will fly off as he looks down with swelling chest at his less fortunate rivals, or he will grit his teeth if he happens to be occupying one of the more lowly places in the league. When a station is in the " relegation " zone, every canvasser, carter, collector and checker hears about it—and someone or other never fails to respond. The head shunter persuades his local church choir that the bracing breezes of Blackpool are just the tonic needed to restore them to the necessary standard of " top A " excellence. That's not the end of the story. The local stationmaster is told about it, and he decided to make the shunter's party the nucleus of a train load by advertising the trip to the public. The final result is another



District	Total	Compared with 1933	Per cent.
	£	£	
Goole	6,217	+ 939	17
Wolverhampton	102,369	+ 13,616	15
Garston	19,090	+ 1,409	7
Sheffield	134,544	+ 18,325	16
Chester	30,064	+ 3,944	15
Fleetwood	6,030	+ 596	11
Derby	211,462	+ 22,480	12
London	303,820	+ 22,897	8
Liverpool	99,765	+ 6,770	7
Stoke	67,262	+ 4,896	8
Birmingham	143,065	+ 7,210	5
Manchester	146,457	+ 4,607	3
Bristol	42,976	+ 1,461	4
Belfast	11,383	+ 310	3
Warrington	128,755	+ 4,420	4
Leicester	111,161	+ 3,589	3
Bolton	98,090	+ 1,122	1
Barrow	79,692	+ 1,851	2
Northampton	53,399	— 3,927	7
Leeds	157,242	— 3,946	2
S.W. & C. Wales	19,591	— 565	3
Dublin	5,406	— 3,417	63

Results by diagram and in figures

£50 or so on to the score sheet. The ways and means of finding the cash are endless. A furniture removal secured here—an odd passenger there—a useful tip of traffic to move to the canvasser from a member of the staff whose brother works at a local factory—the helping hand extended to traveller or trader in a hundred different ways—those are the things—some little—some big—which tend to transform the most pessimistic Mr. Can't into the most optimistic Mr. Can.

In this regard there is another aspect of the matter. Some traffic offers itself for railway transport without any apparent effort being necessary to obtain it; some traffic can be induced to use the railway services by the exercise of initiative and intelligent study on the part of a railway

salesman. There are occasions, however, when he feels absolutely up against it because of the hindrances in his way. It is a case of " if only I could get that particular fare or persuade my manager to give me a special rate at such and such a level." Then he gets down to some hard thinking, and many a time, through persistency and the display of ingenuity, obtains the key of the door which has hitherto been locked against him. Many a problem or drawback militating against the earning of revenue has thus been brought to the notice of the management.

Such instances arise by the score every week, and a local success frequently becomes the pattern for wider application on the railway; sometimes, as in the case of the choir outing, one man's idea leads to a brainwave on the part of another, and it is difficult to say where the effects of a particular transaction end. Like the pebble thrown into the pond, the ripples arise in ever-widening circles.

Notwithstanding all this, it must not be imagined that the staff at L.M.S. stations are allowed, like Gray's ploughman, to plod a weary way; not a bit of it. The L.M.S. management has introduced a daily log known as the Quota Calendar. The form of this calendar is illustrated herewith, and it will be seen that the staff at any station is constantly aware of the state of the scoring board. The Quota Calendar serves the useful purpose of a daily reminder; it is a stimulus to lagging effort and an encouragement when the net position is a plus.

The question which has probably by now come into the reader's thoughts is—how many of the stations succeed in " pulling off " their quota? The answer is rather surprising. Taking the results for 1934, they panned out as follows:—

	Total no. of stations embraced in Quota Scheme	No. of stations where the quota was reached or exceeded	No. of stations which secured increases but failed to reach quota
Passenger	1,552	647	196
Goods	1,113	428	246
	2,665	1,075	442

Looked at on a line basis, however, the results are more striking still because the percentage of quota acheived during 1934 was close upon 100.

The actual results for 1933, the extent to which these were plussed as the basis of the quota for 1934, and the actual achievement of 1934 are shown in the table which follows:—

	1933 actual receipts	1933 figures brought up to quota basis	1934 actual results	Per cent. of Col. 2
	£	£	£	
Goods	20,019,845	21,977,976	21,064,588	96
Passenger ..	17,502,500	18,104,242	17,911,329	99
Total ..	37,522,345	40,082,218	38,975,917	97

Critics of the scheme—and there are plenty—say the results are largely fortuitous; that there is too much hazard to command any real interest in the arrangement. It is quite true that there is a fair amount of chance in placing a given station or district at the top or bottom of the poll. There are weaknesses in the scheme as its authors know, but there is also strength, as is proved by the interest evinced and the tangible efforts made all over the line by the staff in general. In a hundred and one different ways evidence is forthcoming that, though there may be laggards in a purely voluntary scheme of this kind, the L.M.S. staff in general supports it ardently.

It should, of course, be remembered that the Quota Scheme does not stand in isolation; it is part of a comprehensive plan of intensive commercialism. During the past 2½ years the L.M.S. commercial organisation has been completely overhauled from top to bottom: the technique of salesmanship is conveyed to the staff through the medium of classes and lectures, and those who avail themselves of these resources are frequently those who can best help their station to secure an honourable position in the Quota League.

So the game goes on. Once again the L.M.S. staff has been told what heights to climb during 1935, and the top of the hill which must be scaled by the end of 1937 has been pointed out to them. No stone is left unturned by the L.M.S. management, with the aid of its unique Quota Scheme, to remind every potential " go-getter " in its service that every day in every way each man is expected to do his duty—and—here is the point—just a little bit more.

Welded Joints

On March 13 a paper entitled " Recent Developments Regarding Welded Joints and the Effects of Fatigue " was read before the Institution of Welding Engineers by Dipl. Eng. Otto Bondy, M.I.Struct.E.

The lecturer first explained the necessity for considering the effects of fatigue of metals from a practical, as well as a theoretical, point of view So far welding has been used in structures which are in the main loaded statically. The German State Railway has been carrying out some experiments using three types of load variation—(*a*) Alternating stress between equal positive and negative values, (*b*) a stress varying from zero to a maximum either compression or tension, and (*c*) a stress variation between either two positive values or two negative values, *i.e.*, a constant dead load and a variable load acting together. These different vibrations were shown on Wöhler diagrams, and then results from various tests were given in tabular form.

There did not appear to be much difference between a butt weld and a riveted joint, so far as tests had shown. The German State Railway evolved a factor to show the reduction in permissible stress due to fatigue effects. This varies according to the type of load variation, and the number of loadings a day, and varies from 1 to 1·944. The lecturer also remarked how important it was to obtain sound welds, as a fault would reduce the life of the joint very considerably.

British Railway Facts

For some years now the four group companies have combined in publishing annually " Facts About British Railways," a pamphlet giving in an easily digestible form the latest statistical and other information about railway operation. This year the booklet consists of 30 pages, and an innovation is provided in the inclusion of a folding map showing the routes of the principal passenger expresses.

Much of the contents will be familiar to most of our readers, and yet some facts previously unappreciated may easily be discovered. For instance, not all railwaymen may realise that:—

" From British brickfields are purchased annually 14,000,000 bricks; from British mills 2,600,000 yards of cloth; and from British steelworks 195,000 tons of rails;"

" Railway charges for the carriage of foodstuffs are so small that even if all food were carried free there is no coin small enough to allow tradesmen to make a proportionate reduction in their prices;"

" 1,123,600,000 railway passenger journeys were made during last year, and the risk of death in a train accident was 1 in 70,000,000 only!"

" The railways now operate 7,655 goods motor vehicles and during the last three years the passenger trains throughout the country have been accelerated 49,673 minutes daily."

Copies of this booklet may be obtained free on application to the Secretary, the British Railways Press Office, 35, Parliament Street, London, S.W.1.

FURTHER DEVELOPMENTS AT HORWICH WORKS, L.M.S.R.—II

Line system of machining and assembling standard wagon axleboxes

(*Continued from page 551 of last week's issue*)

When the operation of drilling the axlebox for the lid, &c., is completed, it is then moved direct from the fixture to the roller conveyor which leads to the assembly section. The operations of drilling, &c., on the other type of axlebox previously referred to is performed on a radial arm drill situated on the opposite side of the conveyor and adjacent to the small vertical milling machine. The two $\frac{5}{8}$-in. dia. bolt holes are first drilled on the table of the machine and a special jig, as in line drawing Fig. 8, is used in this instance. This comprises a steel plate A with two hardened steel bushes and the correct position of the jig is obtained by locating from the machined lip on one side of the axlebox face. The centre portion of this jig is cut away to house a lever and balance weight arrangement B, which automatically ensures that the setting face of the jig C is always snug against the lip of the axlebox face.

The next operation is drilling and facing the lubricator oil well, as shown in line drawing Fig. 9. A special angle plate is used to give the correct angular setting for the operation, and in order to ensure the correct centre from hinge lug a special box jig A is used as shown in line drawing. After this hole is drilled it is now faced in order to make an oiltight seating for the oil well lid. The hole is used as a pilot for the facing operation and a special facing tool, as shown in line drawing, Fig. 10, is employed. Owing to the shallow depth of the hole it is essential to have a correspondingly short length of pilot on the tool, and as the cutter is re-ground the pilot increases in length—to overcome this difficulty an adjustable type of cutter has been adopted. The cutter is locked in position by the locking collar A and centre screw B in the pilot. The elongated hole C in the shank gives an adjustment of $\frac{3}{4}$ in., and the cutter is driven by the $\frac{1}{4}$-in. pin D through the cutter and the shank. This type of cutter enables the length of pilot to be regulated as the cutter is re-ground, to conform to the depth of the oil well hole.

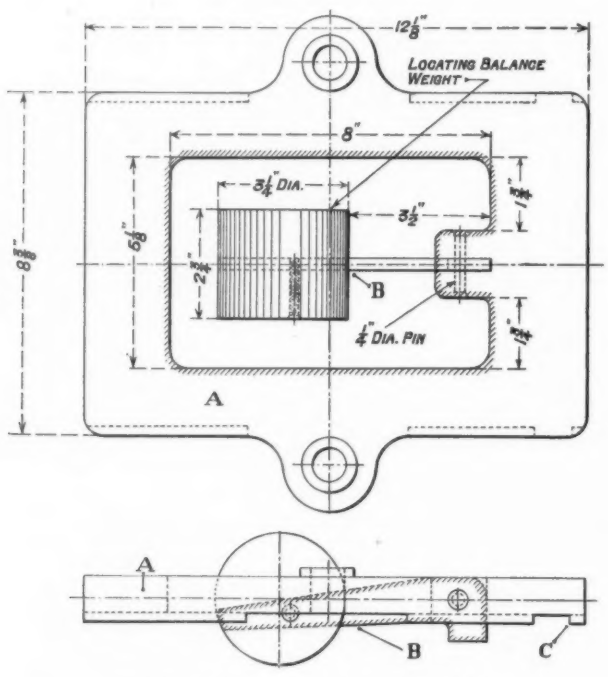


Fig. 8—Drilling jig for wagon axleboxes

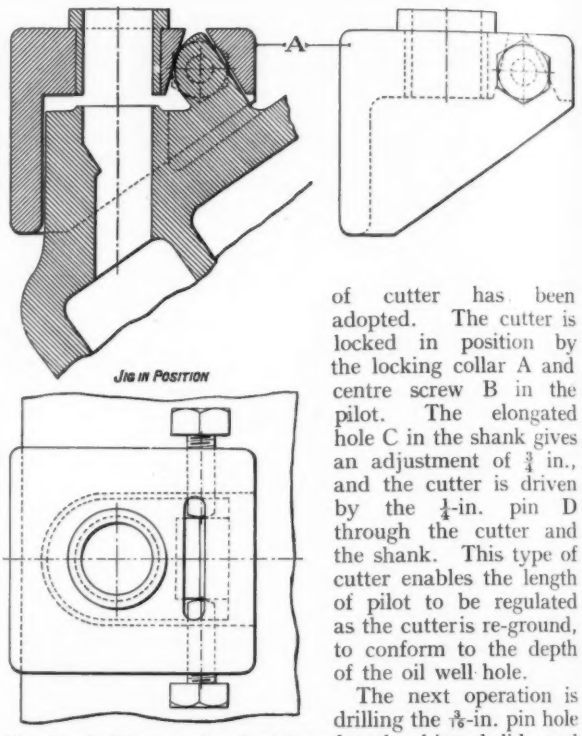


Fig. 9—Drilling jig for feed hole

The next operation is drilling the $\frac{3}{16}$-in. pin hole for the hinged lid, and for this purpose a small box jig locating from the faced hole previously machined, is used, and this ensures correct alignment of the lid and also eliminates any unnecessary fitting. As in the case of the previous type of axlebox, it is now placed on the conveyor leading to the assembly section. The axlebox lids for these axleboxes are machined on two specially converted centre lathes, see plan drawing, adjacent to the drilling machine, and operated by one boy apprentice.

Fig. 10—Facing cutter and bar for A.S.W. type axleboxes

The lids are held in position on the face plate for the facing operation by a box fixture, as in line drawing Fig. 11, which ensures that they lie perfectly flat and also eliminates the necessity of using clamps. The lid is inserted in the fixture A and secured in position by a flat steady B located in the tailstock; the operation consists of machining the face of the lids, which is performed by means of the cross traverse, using special tipped tools.

After machining, the lids are placed on a gravity roller conveyor, and conveyed to the radial arm drill for drilling a $\frac{5}{8}$ in. dia. bolt hole. This machine performs the dual operation of drilling the axleboxes, as previously described, and the lids. For the drilling of the lids, the

jig is located on top of the box bed table and in a convenient position for feeding from the gravity roller conveyor. The jig, Fig. 12, forms an interesting feature from the point of view of simplicity in operation and eliminating clamps. It will be noted from the drawing that one lug of the lid has an elongated slot which is cored, and this point is therefore used as a location for drilling the $\frac{5}{8}$-in. hole in the other lug. The jig is built up on a mild steel plate A, having at one end an adjustable bracket B, on which is fixed the locating pin C; this pin is arranged to slide in a slot in the plate and the varying centres required are fixed according to the type of lid being drilled by the dowel pin D. At the other end a bracket E is fixed with a hardened steel bush, enclosing a sliding V block, and the movement of this block to give

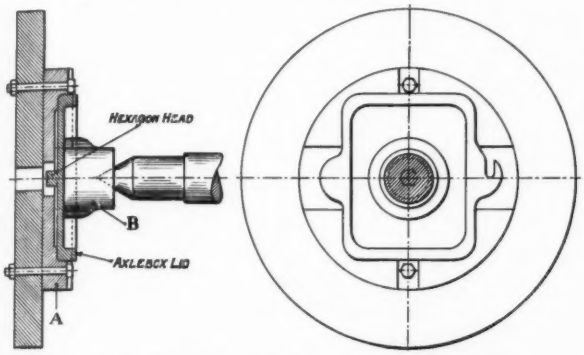


Fig. 11—Facing fixture for axlebox lids

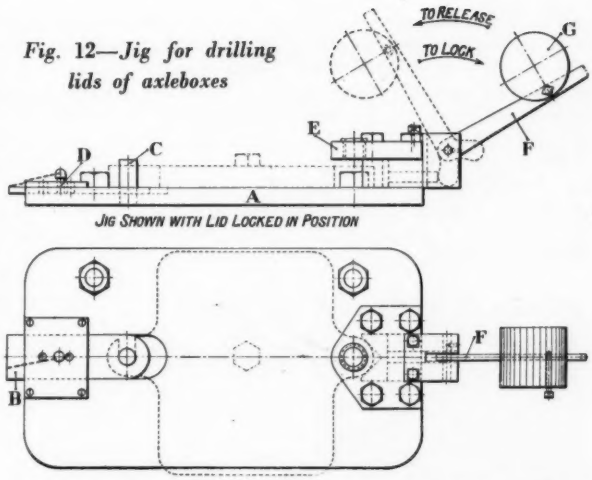
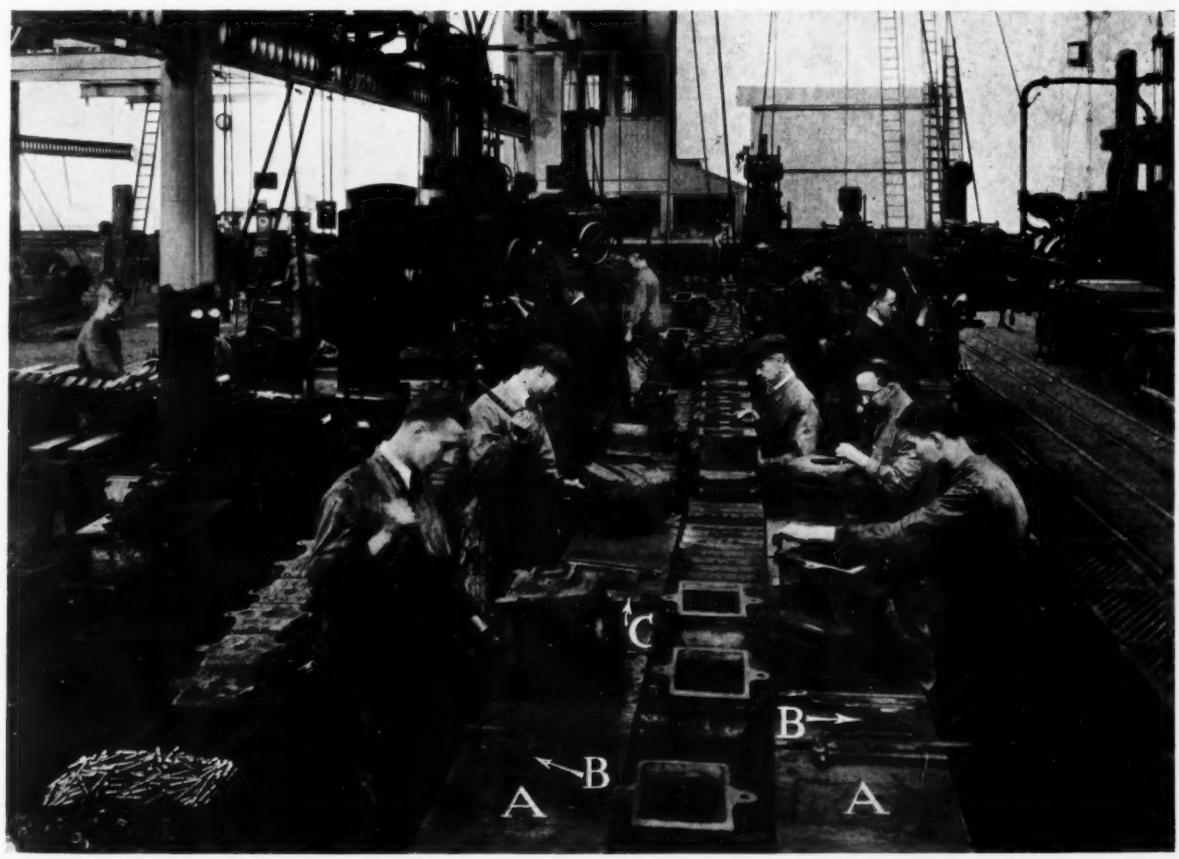


Fig. 12—Jig for drilling lids of axleboxes

the required pressure on the end of the lug is actuated by the lever F and balance weight G. In operation the locking pin is fixed at the centre required and the hooked lug of the lid is located on this pin, the weight being moved anti-clockwise, pressure being thereby exerted on the lug and securely holding the lid in position for drilling.

Gauging and Fitting Methods

After the drilling operation is completed, the lids are placed on a short gravity roller conveyor, see block plan, adjacent to the machine, and conveyed to the bench ready

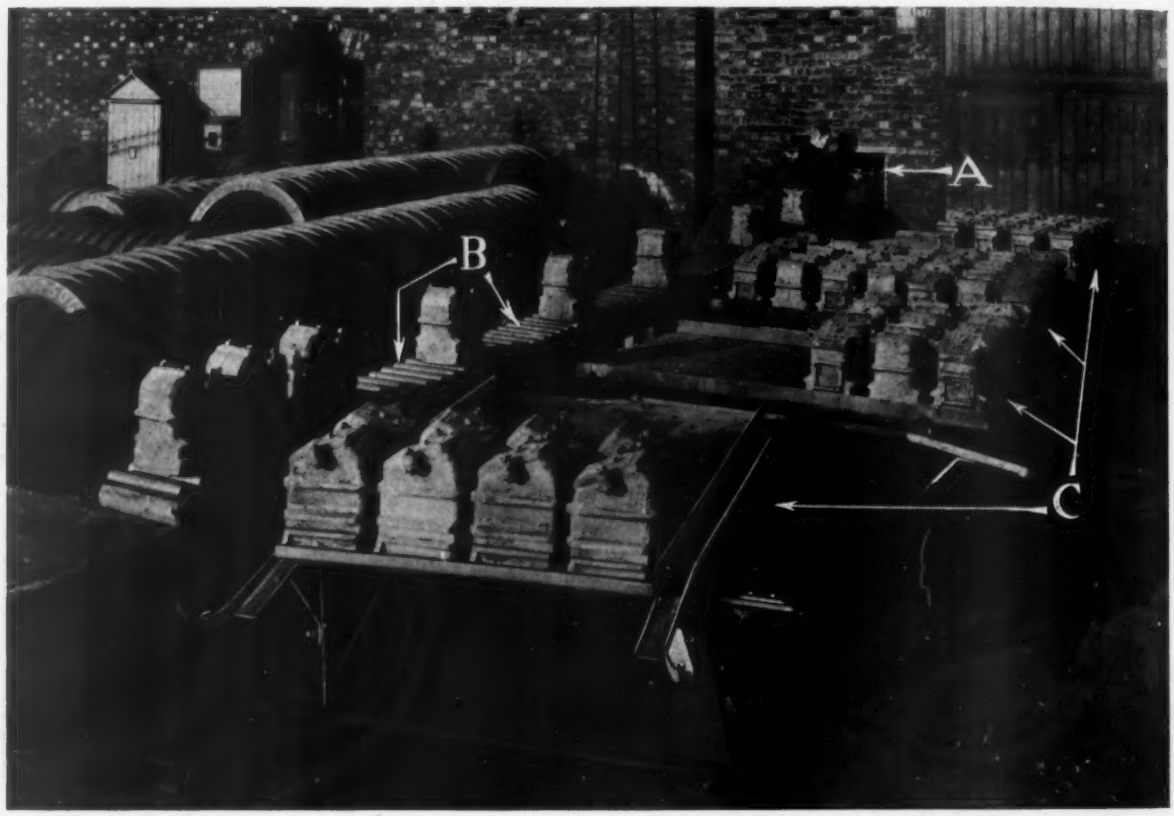


General view of Assembly Section, showing steel benches with roller conveyor between them, machines and templates

for the assembly section, Fig. 13. The various operations involved in this section are carried out in sequence by boys to whom are allocated definite operations on the progressive methods adopted, and these are carried out on the steel benches A, which are fixed on each side of the central roller conveyor. The first operation consists of freeing the axlebox from scale, sand, chips, &c., and it is then passed forward along the conveyor for the next operation of gauging to ensure that the axle brasses will fit correctly in the axlebox. The checking of this is carried out by a template B corresponding to the correct dimensions of the axlebox brass which is placed in each axlebox. The next operation consists of checking the axlebox to receive the dust shield at the back. This is also gauged by a flat template C which has the necessary allowance to ensure requisite clearance for the dust shields.

The box is again passed forward for fitting the lubricator hole lid which is riveted by a $\frac{7}{16}$-in. dia. rivet passing through the lug and lid and riveted over at one side. The riveting of the lid is performed on a special fixture which enables the rivet head to lie snugly in the fixture, whilst the riveting operation is carried out. The next operation consists of final cleaning of the axlebox by means of air pistol operated at a pressure of 100 lb. per sq. in. The axlebox is again passed forward on the conveyor to have an internal coating of varnish and after this operation the lid is assembled by means of two $\frac{5}{8}$-in. bolts, spring washers and nuts.

The axlebox is now completed and passed along the roller conveyor (Fig. 14) through an aperture in the wall, A, to a continuation of roller conveyor B, immediately outside the shop and at the extreme end of the plant. Adjacent to this conveyor, stillages C are fixed in suitable positions for loading direct from the conveyor on to the steel trays. These stillages are similar in design to those fixed in the foundry, of which a description has previously been given. It will be noted from the general plan drawing that additional stillages are fixed at this end, the object of this being to accommodate all types of axleboxes dealt with and also to allocate them according to type as indicated in the drawing. When loaded with completed axleboxes, the trays are taken away at scheduled periods during the day to their various depots by mechanical trucks.



Completed axleboxes are transferred by a roller conveyor from the shop to stillages outside. Mechanical trucks, working to schedule, transfer them to their various depots

From the foregoing it will be clear that from the initial stage of fettling and cleaning the axleboxes in the foundry to their completion, the various operations are maintained at one level, thereby obviating any lifting or lowering and reducing to a minimum all unnecessary movements.

ENGINE TESTING EQUIPMENT. — The British Standards Institution has issued a new edition of British Standard Specification No. 412. Two sections have been added to the original specification of 1931 which standardised the fitting for the attachment of engine indicators so that it would be possible to change an indicator during tests without having to shut down the engine. The specification also standardised the sizes of the indicator cards. The new sections deal (1) with the thread to be used for the connections of all engine testing fittings and (2) to indicator gear. Copies may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s. 2d. post free.

RECENT PRACTICE IN TESTING OF BRIDGES IN INDIA

A series of articles giving a classification of tests, description of the many and various instruments used and of a number of special and typical tests in each class

Part I.—A classification of tests and description of instruments used for all kinds of testing

DURING the last decade and a half, considerable attention has been directed in India to bridge testing as a direct means of obtaining reliable data to form the basis of bridge rules which help the bridge engineer to design economical structures suitable for modern conditions of live load and speed. The tests with which it is proposed to deal in the present article can conveniently be divided into three classes.

Class 1.—Under which may be grouped all tests performed on existing structures that have shown signs of weakness during the periodical inspections or according to calculation under present loads, or where heavier loads are contemplated.

Class 2.—Tests carried out on behalf of the Senior Government Inspector of Railways on new or reconstructed bridges in order to determine whether the structures have been properly designed and erected and to ascertain as far as possible whether they are sufficiently strong in all their parts to support the designed load. When the Senior Government Inspector has signified his approval of these test results and is satisfied with the work in all respects, a certificate is issued to enable passenger trains to cross the bridge at a specified maximum speed.

Class 3.—This includes special tests made in connection with experimental investigations on existing structures, often with live load of accurately known weight and locomotives of known hammer blow. In most cases these investigations are undertaken at the instigation of the Government of India (Railway Board) with a view to modernising the rules for bridge design to afford economy in the weight of steel.

Testing Instruments

Many of the instruments used for these tests have been designed for the Indian State Railways by their Consulting Engineers, Messrs. Rendel, Palmer & Tritton, of 55, Broadway, Westminster, and others have been produced by the engineers in charge of the investigations in India.

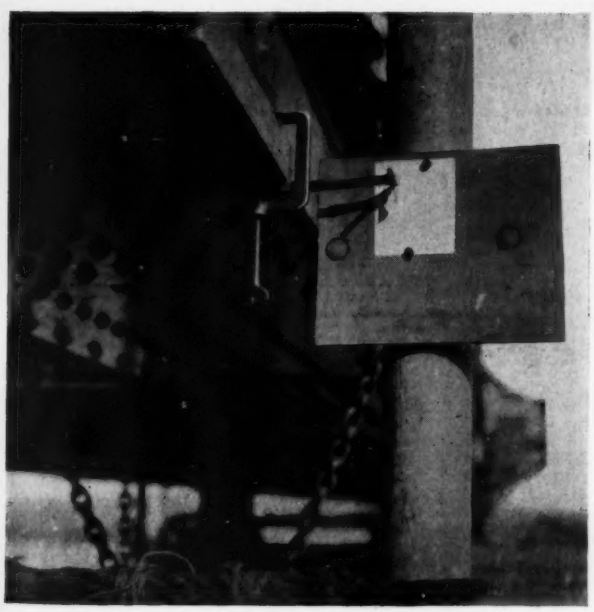


Fig. 1—Pencil and card apparatus in position on lower flange of 250-ft. span

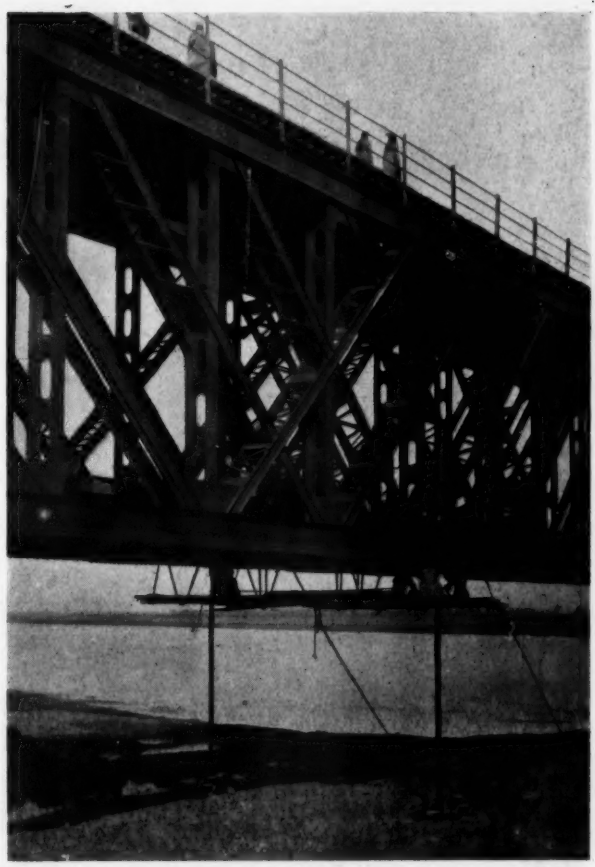


Fig. 2—Arrangement of poles and guys for pencil and card apparatus

It is proposed at this stage to illustrate and describe each of the principal items of testing equipment used for the three classes of tests.

1.—*Pencil and Card apparatus for deflections and oscillations* (*See Figs.* 1 *and* 2)

The test cards are each pinned to a small vertical board which is attached to a support at right angles to the centre line of the track, firmly fixed and stayed to the ground or in the river bed at mid-span. The pencil, which is sharpened to a fine point, is clamped to, and so moves with, the structure over the surface of the card, thus registering the relative movement between the span and the fixed card.

In the case of short spans on plain plate bearings, simultaneous card tests are taken at each support and at mid-span, and any small vertical movements which commonly occur at the supports are subtracted from the

Fig 3.—Fereday optical deflectometer

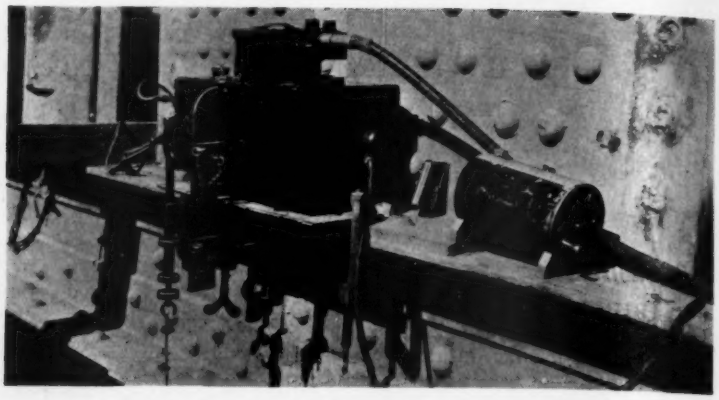


Fig. 4—Fereday optical deflectometer (another view)

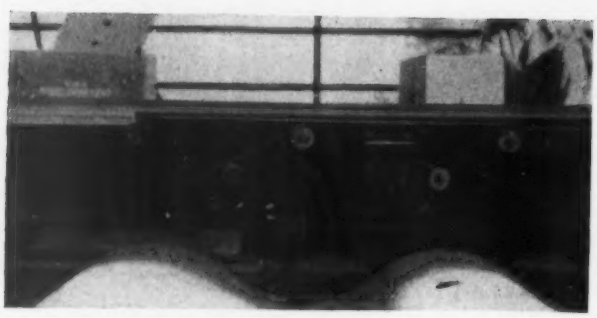


Fig. 5—Rail contact switch for Fereday deflectometers and stress recorders

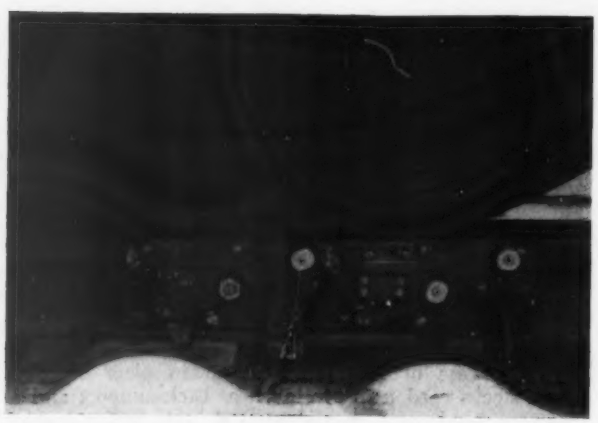


Fig. 6—Rail contact switch depressed by wheel

Fig. 7—Optical deflectometer for recording high frequency vibrations in short span bridges

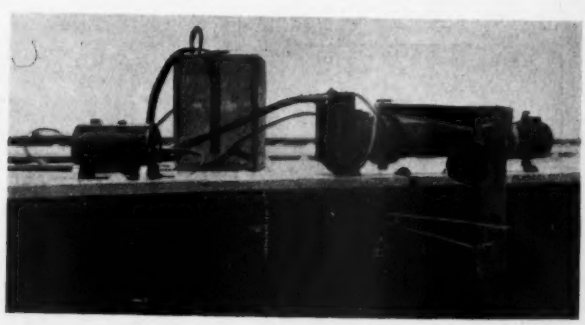


Fig. 8—Fereday-Palmer stress recorder clamped to top boom of a 200-ft. span ready to take a film record

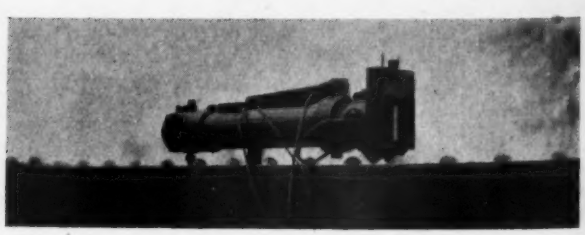


Fig. 9—Fereday-Palmer stress recorder with film holder removed ready for visual observations

central deflection. Such measurements are recorded to the nearest 0·02 in.

2.—*Fereday Optical Deflectometer and Rail Contact Switch* (*See Figs.* 3, 4, 5 *and* 6)

This instrument is used wherever a continuous record of deflection to a time base is required, or where the height above ground or river bed level is too great for the pencil and card apparatus. It has displaced all forms of pencil and drum type recorders. The instrument is clamped to the girder and the moving elements are actuated by a vertical wire connected to the ground or to a weighted wire truss slung from piers in the case of higher bridges. The wire is suitably tensioned by a spring embodied in the instrument. In addition to the deflection, a broken line is given on the film marking quarter seconds by a clock incorporated in the instrument and also a third line marking the position of the live load axles at certain instants during their passage over the span. This latter is controlled by the rail contact switch, which closes an electric circuit and operates an electro magnet in the deflectometer and causes the axle-marking reflecting mirror momentarily to deflect.

3.—*Special Optical Deflectometer for recording high frequency vibration* (*See Fig.* 7)

The use of a spring tensioned wire for actuating the deflectometer sets an upper limit to the recordable girder frequency for any given amplitude. In order to study the oscillations in short span bridges of high natural frequency a positive device is required for actuating the deflectometer mirror. The instrument shown in Fig. 7 was designed to fulfil this requirement, and, as constructed, is suitable where the headway is two or three feet only. It consists of the camera portion of a Fereday-Palmer Stress Recorder, illustrated in Fig. 8, to which a special head is attached. This head carries a horizontal spindle running in ball bearings and carrying a reflecting mirror. The spindle is connected positively to the girder through the horizontal arm and the vertical adjustable rod, which is provided with ball and socket joints at its ends. A beam of light from a small electric bulb is directed on to the mirror on the spindle and reflected from it to a photographic film, which is wound through the instrument by hand during the passage of the live load. The deflection of the girder causes a small rotation of the spindle, twice the tangent of the angle of which is recorded as deflection on the moving film.

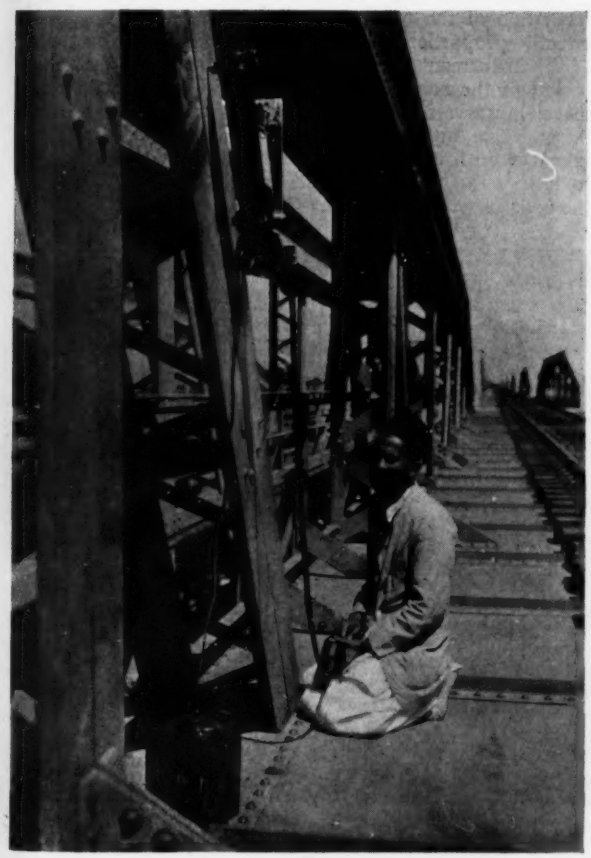


Fig. 10—*Fereday-Palmer stress recorder in position on main diagonal of the Delhi-Jumna Bridge*

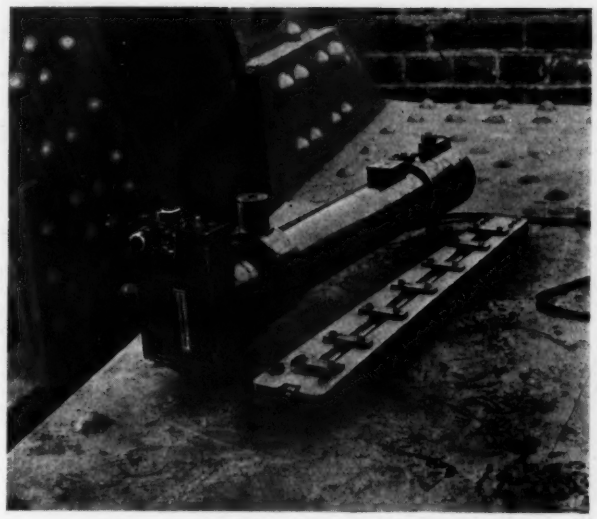


Fig. 11—*Invar gauge bar and stress recorder*

4.—*Fereday-Palmer Optical Stress Recorder* (*See Figs.* 8, 9 *and* 10)

Figs. 8, 9 and 10 show its application to some railway bridges in India. This instrument, which has been widely used in many parts of the world during the last twenty years, is already well known. It was described in the report of the British Bridge Stress Committee in 1928, and scarcely needs further description. The writer believes it still to be by far the most suitable appliance available for recording strains in railway bridge girders. It can be effectively used in practically any situation on a bridge and, after certain modifications, even on light members such as rail bearers subjected to violent oscillations during the passage of the live load.

5.—*Invar Compensating Gauge Bar for Fereday-Palmer Stress Recorder* (*See Fig.* 11)

This consists of a light portable aluminium frame containing a $\frac{1}{4}$ in. diameter Invar rod, which is fastened at one end to the frame and attached to a steel block at the other end, arranged to slide in the frame. Steel plugs are screwed in at the end of the frame where the Invar rod is fastened, to accommodate the two fixed legs of the stress recorder, and a hole is drilled in the sliding block at the thin end of the Invar rod to take the rocking leg of the Stress Recorder. The composite bar takes the place of a complete gauge bar in solid invar, which was not entertained on the score of expense. The apparatus was used in connection with temperature stress measurements on the Lansdown bridge at Sukkur, Sindh, which will be described later.

Fig. 12—Temperature gauge bar and stress recorder

6.—*Temperature Gauge Bar.* (*See Fig.* 12.)

This gauge bar is made from structural bridge steel and is fitted with three plugs to accommodate the points of a Fereday-Palmer Stress Recorder. It has been used in connection with the investigation of erection stresses in large bridge trusses.

7.—*Optical Seismograph for Measuring Lurching of Locomotives.*

The instrument is shown diagrammatically in Fig. 13. It consists of the camera portion of a Fereday-Palmer Stress Recorder to which is attached a special head H, having a horizontal spindle S passing through it supported on ball bearings. Outside the head, masses W are attached to give the rotating system a suitable moment of inertia. This system is controlled by light coil springs which are tensioned to give a definite natural period of oscillation to the masses. A spherical mirror M is rigidly fixed to the spindle on the centre line of the instrument. A second mirror is fitted inside the head to give a time

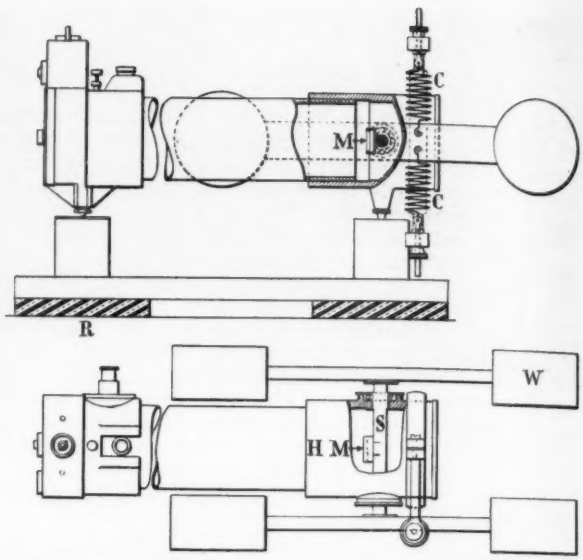
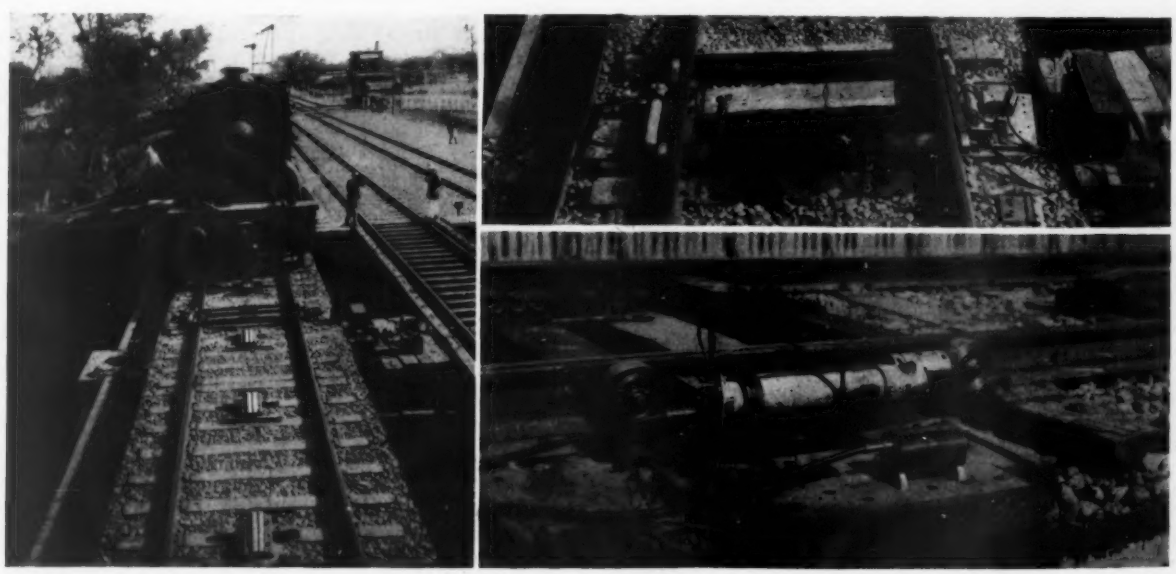


Fig. 13—Optical seismograph for lurch measurements

marking and is actuated by a small electromagnet controlled by a make and break fitted to a master clock. The time marking line is a broken one, the interval being ½ second.

The ordinates of the lurch line on the base of the natural oscillation of the oscillating system of the instrument are directly proportional to the angle of lurch. The period of the instrument is made large compared with the rolling period of the engine on its springs. The instrument was placed transversely on the locomotive frames near the driving axle, and before each day's testing a trial film was taken to measure the natural frequency of the instrument to enable the sinusoidal base line to be traced out when the records were analysed. The distance of the rotating



Figs. 14, 15, and 16—Equipment for investigation of dispersion of longitudinal forces due to braking and traction. The self-aligning ball bearing arrangements to eliminate error due to unequal creep in the two rails are seen in the lower right-hand illustration (Fig. 16)

mirror from the film is 20 in. If Δ is the ordinate on the record measured from the sinusoidal base line in inches, the angle of lurch is $\text{Sin-1} \frac{\Delta}{2 \times 20}$

8.—*Equipment for investigations of dispersion of longitudinal forces due to braking and traction.* (*See Figs* 14, 15 & 16.)

Figs. 14-16 give a general idea of the " track links " which were designed for an axial force of up to 12 tons per track in tension or compression. Self aligning ball bearings seen in Fig. 16 eliminate error due to the creeping of one rail ahead of the other during the test and the stress in the links measured with a Fereday-Palmer Stress Recorder is independent of any bending stress which may exist at any point in the rails during the tests.

The only modification required to be made to the bridge before testing is the substitution of running rails of special lengths with the webs specially slotted at the ends over piers and abutments to take the cross beams and the tie rods $\frac{5}{8}$ in. diameter running parallel to cross beams, and also the removal of ballast under the two sleepers under the links and the insertion of four sets of roller bearings to transmit the sleeper loads direct to the steel deck.

9.—*Special Drawgear with Stress Recorders Attached.* (*See Fig.* 17.)

Fig. 17 shows the special drawgear used to measure the drawbar pull. Electric contact ramps placed at fixed intervals between the rails were each connected to magnetically operated deflecting mirrors situated in each of the four stress recorders attached to the " track links." A brush attached to the front of the engine completed the circuit each time the engine passed over a contact ramp and enabled the position of the test load to be determined when analysing the records. Fig. 18 shows a portion of the apparatus used to measure the deceleration of the live load on application of the brakes for calculating the applied braking force. A wheel $5\frac{3}{4}$ in. in diameter running in ball bearings was attached to a framework pivoted to the locomotive frames. The wheel was arranged to roll on the running rails. A rotary " make and break," or commutator was attached on each side of the wheel and electrically connected to the magnetically operated deflecting mirrors of two optical recording instruments in the engine cab. One commutator was arranged to give two and the other ten " make and breaks " for each revolution of the small wheel to provide a readable record in the earlier and final stages of the braking respectively. Each instrument in the engine cab gave two simultaneous records on a photographic film, namely a time marking operated by a separate electric master clock and a record of the " makes and breaks " worked by the wheel rolling on the running rails. The uses to which these various instruments are put and some special tests are described in the second and third parts of this article which will be published seriatim.

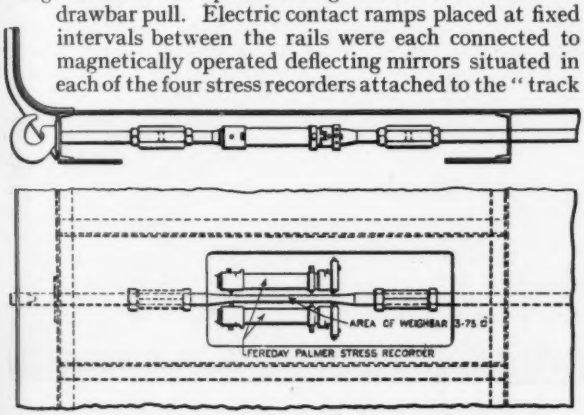


Fig. 17—*Special drawgear to determine drawbar pull*

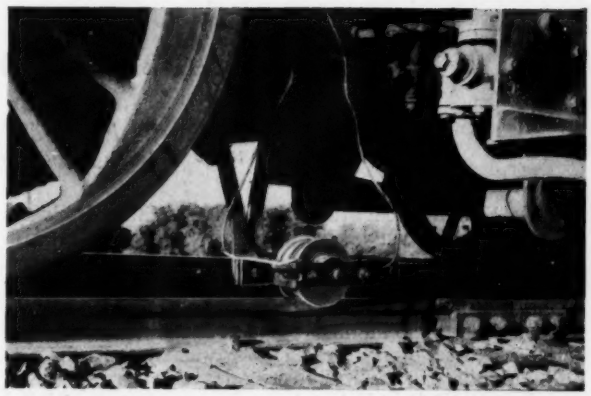
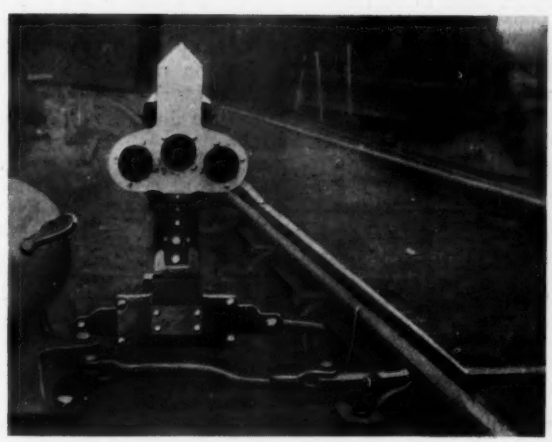


Fig. 18—*Apparatus for measuring deceleration of locomotive when brakes are applied on bridge*

A New Pattern of Ground Signal

A NEW pattern of ground signal has recently been supplied to the Kenya and Uganda Railways for loop or siding points. It gives three indications with miniature back repetitions, green for the main line, yellow for the loop or siding, and red for the improperly thrown points. This indication of improperly thrown points is new to railway signalling and should prove a useful contribution to safety in operation, especially on lines where the infrequency of trains does not warrant a fully signalled and interlocked layout at stations and crossing loops. A feature of the repetition miniatures is that the red light is now formed of a strip continuing from the green to the yellow in order that there may be no " black-out " with the risk of giving the station staff an incorrect impression of the state of lamp or points. The horizontal slide and the pivoted arm constitute the only moving parts, the former being directly connected to the points by rodding.



NEW POLISH-BUILT LOCOMOTIVES FOR LATVIA

A 2-6-2 broad-gauge passenger tank engine and a 2-8-0 narrow-gauge type with tender for service on the Latvian State Railways

DURING the year 1934 the Latvian State Railways Administration placed an order with the Pierwsza Fabryka Lokomotyw w Polsce, of Chrzanow, Poland, for three 5 ft. gauge passenger tank locomotives of the 2-6-2 type. It was stipulated that the design should have a maximum number of parts interchangeable with those of three other types similarly standardised. In addition, the engines had to be adaptable for service on broad gauge (5 ft. 0 in.) and standard gauge (4 ft. 8½ in.) lines with the minimum of alteration, which was to involve no more than the relatively minor operation of changing the wheels and axles.

The locomotives with which the parts of the new tank engines were to be interchangeable comprise a 2-6-2 tank locomotive for light goods train working, a 0-8-0 shunting tank locomotive and a 2-10-0 heavy goods type with tender, and the maximum weight on rails for all these engines was not to exceed 16·7 tons an axle.

The 2-6-2 tank engines of the type illustrated have the following principal dimensions:—

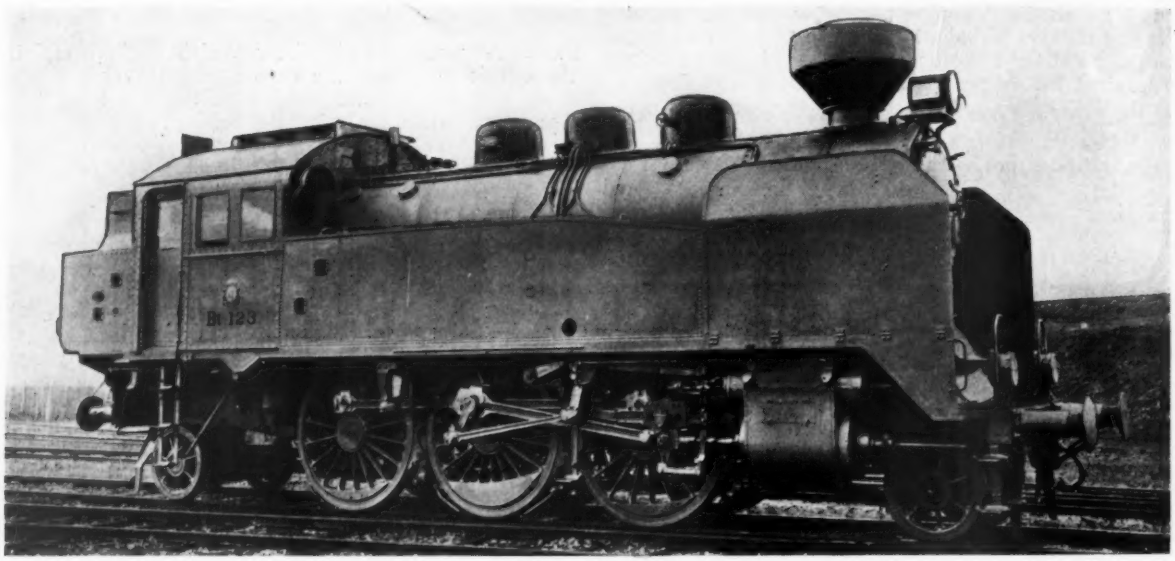
Cylinders, dia	19 in.
,, stroke	24¾ in.
Wheels, coupled, dia.	5 ft. 7⅞ in.
,, pony, dia.	2 ft. 11½ in.
Heating surface, boiler	1,205·6 sq. ft.
Superheater	430·6 sq. ft.
Grate area	23·7 sq. ft.
Working pressure	213 lb. per sq. in.
Capacity of water tanks	1,760 galls.
,, coal bunkers	27·5 cu. ft.
,, wood ,, ...	105·8 cu. ft.
Weight in working order	82 metric tons.
,, on coupled wheels	50 metric tons.

It will be noticed from this table that both coal and wood are used as fuel, and this influences certain factors with regard to the boilers, the dimensions of which had to be calculated accordingly.

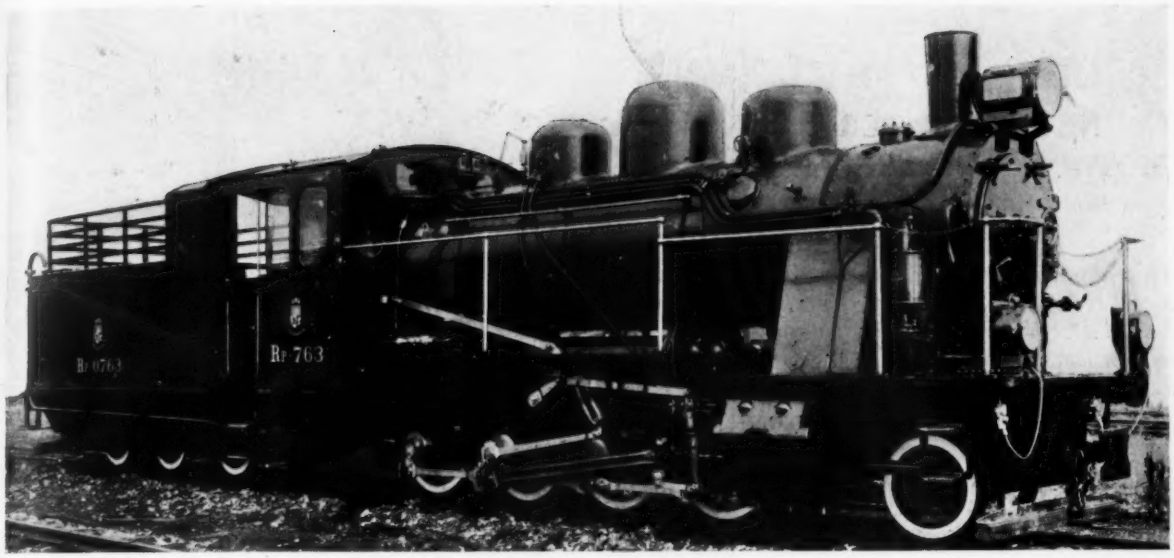
The stipulated tractive conditions of the locomotives made it desirable to adopt a boiler pressure of 213 lb. per sq. in. for all four types, with identical cylinders for all but the 2-10-0. The two 2-6-2 type tank engines are practically identical, differing only in the diameter of the coupled wheels.

The inner firebox is of copper and is stayed to the outer firebox casing by means of copper staybolts and iron anchor-bolts. A Marcotti firebox is used; this opens inwards, and the grate is equipped with a shaking section operated from the driver's cab. The smokebox contains a double-loop superheater header, a movable wire-gauze spark arrester and a smokebox sprinkler. Water is fed to the boiler by a Friedmann injector and also by an exhaust steam re-heater. The inlet valves of the re-heater are located in a special dome containing the turbine for atomising the water, as well as cascades in the form of angle-irons for freeing the water mechanically from sediment. The sediment thrown out is carried by side channels to the bottom of the boiler barrel, where a sludge outlet cock is placed, equipped with a Friedmann slide operated by hand from the footplate.

The cylinders are placed outside the frames and drive the middle pair of coupled wheels. Steam distribution is effected by piston valves actuated by the Heusinger modification of the Walschaerts valve motion; the Trofimoff by-pass device is incorporated. A Kuhn loop apparatus is used to enable the cylinder exhaust valve ports to be uncovered to the same extent in both forward and backward gear, which is found advantageous in the operation of tank locomotives running frequently in reverse.



New 2-6-2 type tank engine built in Poland for Latvia



One of the narrow gauge 2-8-0 type locomotives

The framing is of the bar type, 3⅛ in. thick, with cast steel cross stretchers for bracing. The front and rear pony trucks are identical in construction, and are fitted with spiral springs. The weight of the engine rests on a single centre sliding pivot on the cast steel body of each truck, and both spiral and plate springs are used for the bogies.

Soot blowers for clearing the small tubes, coal and smokebox sprinklers, carriage warming apparatus, Ackermann safety valves and Hasler speed indicator are included in the equipment of the locomotive. The brake mechanism comprises a Knorr compressed air brake supplemented by a hand brake. Sand is applied to both sides of the driving wheels; there is a separate pipe to the leading and trailing coupled wheels, and the gear can be operated by hand or by compressed air.

Special attention has been devoted to the insulation of the boiler, cylinders and other parts in view of the severe frosts which occur in Latvia. For this reason, the whole interior of the driver's cab has been panelled with wood and the cab can be completely closed, the side carriage-type doors having drop sash windows. Smoke deflector plates are located on each side of the smokebox in continuation of the side tanks. The lubrication of the cylinders and valves is effected by a Friedmann 14-feed mechanical lubricator.

It may be mentioned that this order is the second in succession received by a Polish locomotive works from the Latvian State Railways.

The other locomotive illustrated was built at an earlier date for the same railway as one of an order for six locomotives and tenders placed with the Pierwsza Fabryka Lokomotyw w Polsce. These engines were built for 2 ft. 6 in. gauge lines and are of the 2-8-0 type. Their leading particulars are as follow:—

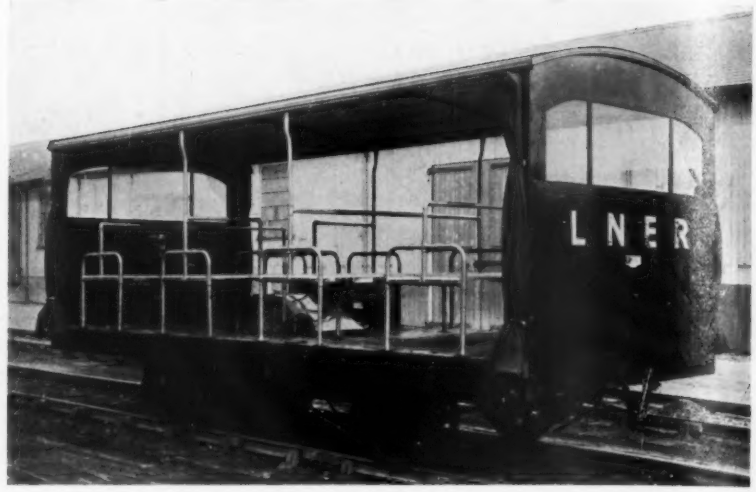
Cylinders, dia.	14¾ in.
,, stroke	19¼ in.
Wheels, coupled, dia.	2 ft. 11½ in.
Heating surface, boiler	622 sq. ft.
Superheater	193·7 sq. ft.
Grate area	17·2 sq. ft.
Working pressure	199 lb. per sq. in.
Weight in working order	32·5 metric tons.
,, on coupled wheels	28·5 metric tons.
Weight of tender in working order	23 metric tons.

Although intended for service on a narrow gauge track, the specification called for the installation of modern equipment as used on standard gauge locomotives.

On page 498 in our issue of March 15, the recent flood damage to the Victorian Government Railways was described. The illustrations above show the destruction of the line between Traralgon and Glengarry, Gippsland, Victoria, due to the flooding of the Latrope River in December last

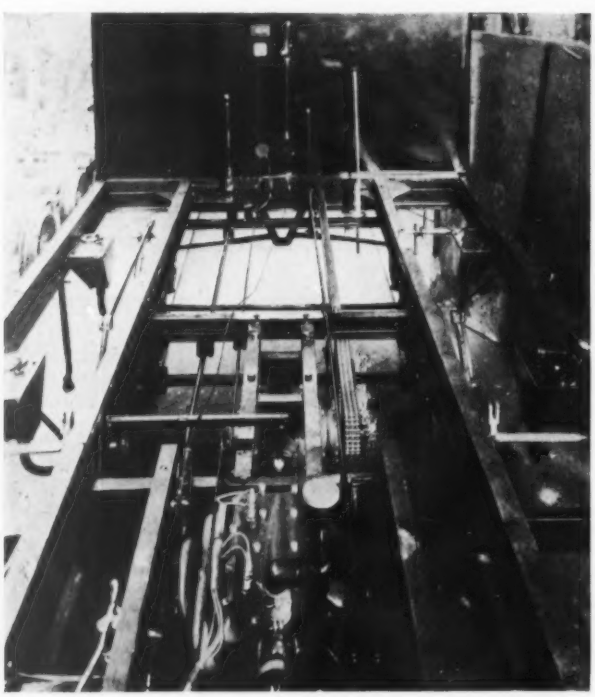
NEW 38-SEATER MOTOR GANG TROLLEY

This abnormally large Abtus vehicle was recently purchased by the L.N.E.R. for service in Scotland where construction gangs have to be moved quickly over considerable distances



THE largest platelayers' trolley ever built in this country has just passed tests on the L.N.E.R. and is to be placed in service in Scotland. The trolley, which is like a small four-wheeled bus with open sides and plain wooden seats, will carry 38 men and their equipment. It is intended to convey large construction gangs of workmen to the scene of operations quickly so that time may be saved in travelling and utilised in working on the track. This trolley, known as the Abtus, has been supplied by the Abtus Permanent Way Equipment Company of London, and is fitted with a Ford four-cylinder water cooled petrol engine, developing 52 b.h.p. In conjunction with the standard three speed gearbox, the Abtus special reverse box is installed, giving three speeds in either direction, and, to add to its general utility, the trolley has complete double end control. Sanding pipes are fitted on both sides of each drive wheel, and complete weather protection is afforded by waterproof curtains which slide along runners fitted to the roof of the car. The radiator is slung underneath the chassis, where it cannot be damaged, and the deck of the trolley is perfectly clean except for part of the engine casing. The canopy top and seats are detachable.

At the official acceptance tests on the L.N.E.R. the load carried was two tons dead weight and fourteen men, in other words the equivalent of 42 men, and the trolley was accepted as completely satisfying the contract. The test run was 14 miles out and 14 miles home, and on the way back, notwithstanding certain stops for tests such as brakes, the total return journey was covered in 28 min. On a measured mile an easy speed of 35 m.p.h. was accomplished, this being considerably more than that asked for by the contract, and on a 1 in 70 grade, with the load mentioned above, on half throttle, a speed of 20 m.p.h. was attained.



The 38-seater Abtus motor gang trolley chassis with Ford engine, special gearbox, controls and sanding gear

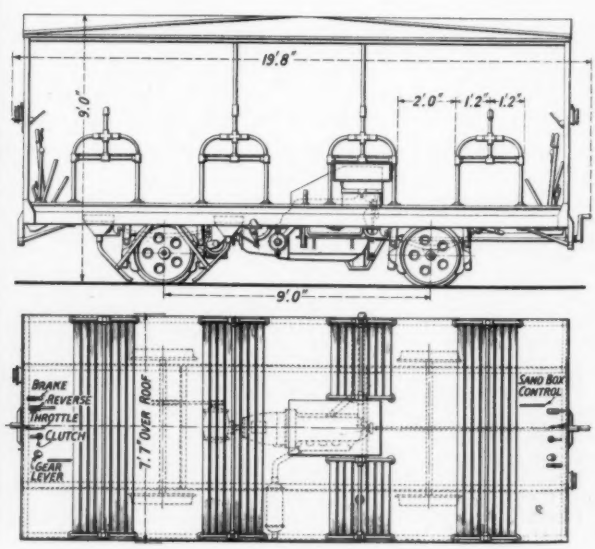


Diagram of the 38-seater Abtus motor gang trolley for the L.N.E.R. in side elevation and plan

RAILWAY NEWS SECTION

PERSONAL

We note with regret the recent death of Mr. John Ellis, who retired from the position of District Superintendent, Western Division, Southern Scottish Area, L.N.E.R., at the end of 1931.

From the *London Gazette* of March 22:—The King has been graciously pleased to confer the Efficiency Decoration upon the undermentioned officer, under the terms of the Royal Warrant dated September 23, 1930:—Engineer and Railway Staff Corps: Major Hewitt Pearson Montague Beames, M.Inst.C.E., M.I.Mech.E.

We regret to note the death, on March 23, of Sir George Clark, who for many years was Chairman of the Great Northern Railway, Ireland, and one of the founders of Workman, Clark & Co. Ltd., the famous shipbuilders of Belfast.

It is with regret that we note the death, on March 20, of Mr. E. E. Williams, a solicitor who specialised in licensing and the law of railways, and author of "Manual of the Law and Practice in the Railway Commissioners' Court" and "Epitome of Railway Law."

Mr. John A. Meelboom, M.Inst.T., Assistant to the General Manager, Central Argentine Railway, retired at the end of February after 27 years' service with the company. His portrait and full biography were published in THE RAILWAY GAZETTE of January 19, 1934. Briefly, however, it may be recalled that he passed his chartered accountant's examinations with honours, and was first in the United Kingdom in the Society of Arts bookkeeping examinations, receiving the special prize of the London Chamber of Commerce. After experience in England he was appointed Assistant Accountant to the B.A.G.S.R. in 1902, and, between 1905 and 1908, reorganised the accounts of the Cuban Central Railway. In the latter year he became Chief Accountant, Central Argentine Railway, a post he held for 25 years, until his appointment as Assistant to the General Manager in 1933. At the time of his retirement he was Honorary Treasurer of the Argentine and River Plate Centre of the Institute of Transport.

Mr. J. C. Highet, F.C.H., A.M.Inst.C.E., Agent of the North-Western Railway, India, who, as announced in THE RAILWAY GAZETTE of November 16 last, has been elected President of the Indian Railway Conference Association for 1935-36. takes office on April 1. Mr. Highet was born in 1884, and went out to India from the Royal Indian Engineering College, Cooper's Hill—where he was one of the top men of his year and was awarded a Fellowship of Cooper's Hill—as an Assistant Engineer on State Railways in 1905. He gained valuable experience on open line and construction works and also upon the Kashmir railway surveys in that grade. Becoming an Executive Engineer in 1914, he subsequently held the following posts: Assistant Secretary, Railway Board, and Munitions Board, of which he afterwards became Controller of Railway Materials; Secretary, Indian Stores Purchase Committee and Assistant Agent, N.W.R. Mr. Highet officiated as Deputy Agent between 1923 and 1926, then being appointed Secretary to the Railway Board. Subsequently he became Director of Establishment with the Board. He officiated as Agent, N.W.R., for six months during 1931, prior to his confirmation in that post in 1932.

Mr. J. C. Highet, F.C.H.,

Agent, North Western Railway and President, Indian Railway Conference Association, 1935-36

On the completion of 30 years' service, Mr. Alexander Lowe McColl, Deputy Chairman of the Vacuum Oil Co. Ltd., was entertained at dinner by his fellow directors and a large gathering of the company's executives. During the evening Mr. Wilson Cross, Chairman, presented Mr. McColl with a set of pearl studs as a souvenir of the occasion.

It is with regret that we announce the death of Mr. H. C. Brocklehurst, M.B.E., M.I.Mech.E., M.I.S.E., London Manager of Messrs. Robert W. Hunt Co. Inc. Ltd., Inspection and Consulting Engineers, Ludgate Hill, E.C.4.

After 37 years' distinguished service on the South African Railways, Mr. J. A. Harris, the Assistant General Manager (Commercial), proceeded on leave prior to retirement on March 8. Mr. Harris was born in Yorkshire of Welsh parentage, and began his railway career on the former London & South Western Railway. He started his South African railway service at Capetown in 1898, and in the following year was transferred to the Imperial Military Railways. He was Assistant Traffic Manager at Waterval Boven and Braamfontein, and subsequently became Assistant to the Chief Traffic Manager. At the date of Union (1910) he was appointed Assistant Superintendent, then Operating Superintendent, and later Chief Operating Superintendent for the Union. During the great war Mr. Harris was Divisional Superintendent at Kimberley. In 1922 he was appointed Divisional Superintendent at Pretoria, and in 1927 Assistant General Manager at Bloemfontein, with control over the Free State, Cape Midland and Cape Eastern Divisions. On the reorganisation of the railways he was appointed System Manager, Capetown, and later at Johannesburg. In 1929 he succeeded Mr. R. B. Getliffe as Assistant General Manager (Commercial). Mr. Harris was closely associated with the compilation of the first Trains Regulations Book, the correlation of the station instructions at the time of Union, and the drafting of General Railway Regu-

lations. Always approachable, Mr. Harris is an exceedingly able official, and he was popular with all ranks. He wrote extensively on railway subjects, and contributed to overseas technical journals, including THE RAILWAY GAZETTE, in which was published his series of articles dealing with "Essential Services in Railway Operations and Control," during 1920.

Mr. J. A. Harris,

Assistant General Manager (Commercial), South African Railways and Harbours, 1929-35

Mr. W. T. Everall, O.B.E.,

Deputy Chief Engineer, Bridges, North Western Railway (India), 1930-35

Mr. W. T. Everall, O.B.E., M.Inst.C.E., Deputy Chief Engineer, Bridges, North Western Railway, India, who, as announced in the Indian Staff Changes below, has recently been granted leave preparatory to retirement, was appointed to the Indian State Railways as Assistant Bridge Engineer in the year 1908 and posted to the North Western Railway. From September, 1916, to April, 1921, he assisted the Military Department in the design and erection of military road bridges on the N.W. Frontier and trans-frontier roads, completing in all an aggregate of about two miles of bridging, notable among which were bridges across the Tochi, Kurram and Kabul rivers. He was mentioned in despatches in 1919 and again in 1920, and later, in consideration of the excellent work done by him on the frontier received the O.B.E. The military pattern bridge designed by Mr. Everall is now a standard type for the Army and is known to Royal Engineers throughout the Empire. Mr. Everall was appointed Bridge Engineer, North Western Railway in 1918, and Deputy Chief Engineer (Bridges), in 1930 and has been responsible for the re-fabrication of old girders for such great bridges as those over the Jhelum, Chenab, Sutlej and Ravi, and for girder erection over the Indus (two bridges) and many other famous rivers. He has been serving as a member of the Indian Railways Bridge Standards Committee continuously since 1927 and has been intimately connected with bridge research work on "impact" and the revision of bridge rules for specifications and bridge standards. He has also been employed in an advisory capacity on special works for the Military Department, Public Works Department and various public bodies. In 1930, after completing the reconstruction of the Attock Bridge across the Indus, he was elected a Member of the Institution of Civil Engineers, and is also a member of the advisory committee of that institution in India. His reputation as a practical and theoretical bridge expert extends far beyond India, as testified to by his papers read before the Institution of Civil Engineers and his authoritative standing with the International Railway Congress. He has also been largely responsible for the undoubted prestige in matters of bridgework, established in recent years throughout the world, by the Indian State Railways, an Editorial note upon which will be found upon page 591.

Mr. E. C. Gordon Engiand, Aviation Director of the Vacuum Oil Co. Ltd., has relinquished his position upon being appointed Joint Managing Director of General Aircraft Limited.

Mr. Charles Reginald Schiller Harris, who, as announced in our issue of March 15, has been appointed a member of the local boards of the Buenos Ayres Great Southern and Buenos Ayres Western Railways, has been Editor of the *Nineteenth Century and After* since 1930; he has also been a special writer on economics and finance, including railway matters, on the editorial staff of *The Times* since 1925, and a Fellow of All Souls College, Oxford, since 1921. He is, moreover, a regular contributor on railway matters to the *Economist*. Mr. Harris is the son of Sir Charles Harris, G.B.E., K.C.B., late Permanent Head of the Finance Department at the War Office. He was born in 1896 and educated at Clifton, where he obtained a scholarship at Corpus Christi College, Oxford. He took a First Class Lit. Hum. degree in 1920 and became a Visiting Fellow of Princeton University, of which he is a Ph.D., as well as being an M.A. and D.Phil. of Oxford.

Mr. C. R. S. Harris, M.A.,

Appointed a Local Director of the Buenos Ayres Great Southern and Buenos Ayres Western Railways

Elliott] *[& Fry*

The late Mr. Edwin Treacher,

Permanent Way Department, Southern Railway and Honorary Editor, Permanent Way Institution *Journal*

We regret to record the death on March 23 at Woking, after an operation, of Mr. Edwin Treacher, A.M.Inst.C.E., of the Chief Engineer's Department of the Southern Railway, and Honorary Editor of the Permanent Way Institution *Journal*. Mr. Treacher was born in 1877. He joined the service of the old London & South Western Railway in 1890, and was attached to the drawing office of the

District Engineer at Eastleigh. He was transferred in June, 1902, to the Chief Engineer's Office at Waterloo, where he served under five chief engineers. Among some of the important works he carried out during his early years at headquarters were the installations for gas lighting and water supplies on the Meon Valley line, and the design of the new types of switches and crossings then being introduced. During the war he was engaged in the engineering work connected with the transport of heavy and out-of-gauge loads such as guns, tanks, and other war material. In April, 1920, Mr. Treacher was appointed Assistant to Mr. W. H. Shortt and succeeded him as Permanent Way Assistant to the Chief Engineer in January, 1922. On the formation of the Southern Railway in 1923, he was selected as deputy to the Permanent Way Assistant to the Chief Engineer of the group. Between 1923 and 1925, he was responsible under the Chief Engineer for the design and equipment of the permanent way shops at Redbridge. For several years Mr. Treacher carried out the annual track inspection for premium awards, on the Somerset & Dorset joint line and the Isle of Wight lines. On January 1 last Mr. Treacher succeeded Mr. W. A. Messer with the title of First Assistant for Permanent Way under Mr. C. A. G. Linton, Assistant Engineer for General Maintenance. Mr. Treacher was a well-known and popular figure in railway engineering circles throughout the country and as Honorary Editor to the Permanent Way Institution *Journal* for over 20 years, he did much to advance that institution to its present influential position.

The funeral, which took place at Woking on March 27, was attended by a large gathering of mourners, including officers and members of the Permanent Way Institution, and of the Southern Railway. Mr. C. A. G. Linton represented Mr. George Ellson, the Chief Engineer.

Mr. A. S. Bobby, Chief Mechanical Engineer, Ceylon Government Railways, is at present on leave in this country.

We regret to note the recent death of Brigadier-General, the Hon. Ferdinand Charles Stanley, a Director of the Birmingham Railway Carriage & Wagon Co. Ltd.

We learn with regret of the death of Mr. John Gray, B.Sc., M.I.E.E., a Director, and formerly for over 30 years Manager of the Patents Department, of the British Thomson-Houston Co. Ltd.

Mr. T. A. Wellum, A.M.I.Chem.E., late Sales and Commercial Director, Super-Centrifugal Engineers, Limited, has accepted an appointment with British Separators, Limited, makers of Vickcen centrifugal separators and purifiers. He will take over the London office, 15, Broadway, S.W.1, on March 25.

Mr. T. Delmore, Assistant Locomotive Superintendent, Sierra Leone Government Railways, is at present on leave in England.

INDIAN RAILWAY STAFF CHANGES

Mr. R. L. Ray, Chief Mechanical Engineer, E.I.R., has been granted 21 months' leave preparatory to retirement as from March 24.

Lt.-Col. H. W. Wagstaff, R.E., has been appointed to officiate as Deputy Agent, N.W.R., as from February 8.

Mr. E. Ingoldby, Officiating Chief Mechanical Engineer, G.I.P.R., has been appointed Deputy Chief Controller of Standardisation, Railway Board, as from February 13.

Mr. W. T. Everall, O.B.E., Deputy Chief Engineer, Bridges, N.W.R., has been granted five months' leave preparatory to retirement as from March 18.

Mr. L. G. W. Hill, Chief Engineer B.-N.R., has been appointed Acting Agent vice Mr. V. E. D. Jarrad, Agent, granted leave, as from March 2. In consequence Mr. A. C. Austin has been appointed Acting Chief Engineer, Mr. A. L. Carroll, Acting Deputy Chief Engineer, and Mr. W. H. C. Kelland, Acting Superintendent of Maintenance.

L.N.E.R. Rating Assessment Valuation

(*See editorial article on page* 592)

At the hearing of the Railway Assessment Authority which began on Thursday of last week, and to which we referred briefly on page 565 of THE RAILWAY GAZETTE for last Friday, representations were made in respect of the sum of £3,500,000 which appears in the draft railway valuation roll as the net annual valuation of the undertakings of the L.N.E.R. in England. The railway company made representation that a nominal figure should be substituted for that of the £3,500,000, and 15 County Borough Councils and 27 County Councils represented that the figure should be £5,000,000.

Mr. Walter T. Monckton, K.C., counsel for the L.N.E.R., read the correspondence concerning the hearing of the L.N.E.R. representations. In a letter dated February 22 the railway company asked if the authority proposed to appeal in the Southern Railway case, and suggested that, if there were to be an appeal, the hearing of its representations should be postponed. To this the authority replied there could be no postponement of the hearing.

After the reading of the representations, Mr. Joshua Scholefield, K.C., Chairman of the authority, said, in explanation of the method followed by the authority in arriving at the assessment, that, since the figure of £3,500,000 had been arrived at, the construction of the Act had come under the consideration of the Railway and Canal Commission Court in the appeal by the Southern Railway. Applying the judgment in the Southern case to the L.N.E.R. case, it seemed on the materials laid before the authority that the net annual value of the latter was nil. He could imagine local authorities upon any appeal to the House of Lords in this case, should there be an appeal, arguing that this was an absurd result. Continuing, he said it had been decided that day by the authority to appeal to the House of Lords against the decision of the Railway and Canal Commission in the Southern case, but so long as that decision stood the authority would do its best to apply the principle of the decision to the L.N.E.R. case. It would, therefore, seem that the authority would have no choice but to substitute for the figures now in the roll some thousands of noughts. If the principle of the decision of the Railway and Canal Commission was followed, and there would be, as he feared, a nil assessment in the case of the L.N.E.R., one effect would be that the railway company would apparently be entitled to get back what had been paid into the Railway Freight Rebates Fund from April, 1931, to December, 1934, in respect of England and Wales. This would amount to about £3,500,000, in addition to about £75,000 a month, which was continuing to be paid into the fund. It appeared that either the traders would have to be called upon to refund these large sums or that the fund would be a debtor to the railway company. Another effect of a nil assessment would be that the amount paid in rates by the company during the present year would have to be repaid, and about £1,250,000 paid in local rates from April, 1931, to December, 1934, would have to be refunded to the company by the 640 rating authorities through whose arrears the L.N.E.R. system extended.

The hearing was resumed on Friday morning in order to allow Mr. Monckton to comment upon the Chairman's remarks. In the course of a brief statement Mr. Monckton said that the railway company had considered the Chairman's statement, and, after consultation with the other railway companies, had instructed him to say "In no case where a rebate has been properly allowed can a trader be called upon to repay it. Any over-payments into, and repayable out of, the Railway Freight Rebates Fund can only be a debt of the fund and cannot involve any liability on the part of any trader or other railway company."

The hearing was then concluded, and it now remains for the Railway Assessment Authority to complete the valuation roll, and in due course advise the parties of its final decision.

May Timetable Alterations

(*See editorial note on page* 591)

As last year, new timetables for the early summer will come into force on the London & North Eastern and London Midland & Scottish Railways on April 29, and will continue in force until the introduction of the full summer service on July 8. An improvement will be effected in the train service between Liverpool, Manchester, and Newcastle-on-Tyne, for which both companies are jointly responsible. A new express will leave Newcastle at 8.55 a.m., travelling via York to Leeds, which will be reached at 11.3 a.m., where it will take up the times of the existing 11.10 a.m. express, which will be accelerated to reach Manchester (Exchange) at 12.20 instead of 12.36 p.m., and Liverpool (Lime Street) at 1.9 p.m. From Darlington to York this train will be booked to cover the 44·1 miles in 43 min. In the reverse direction the 5 p.m. express from Liverpool (Lime Street) and 5.53 p.m. from Manchester (Exchange) to Leeds will be extended to Newcastle, via Harrogate, reaching Newcastle at 9.15 p.m. These trains, which will be provided with restaurant cars in both directions, are a revival of pre-war facilities, but take 18 min. less on the journey westbound and 15 min. eastbound; the latter journey might be accelerated a further 10 min. by cutting down the booked stop of 15 min. at Manchester (Exchange). Additionally, the 9 a.m. from Liverpool to Newcastle, via Leeds, Harrogate, Stockton, and Sunderland, and the corresponding return train at 4.17 p.m., will be provided with restaurant cars throughout, instead of between Leeds and Newcastle only. A dining car will be run on the 5.45 p.m. from Liverpool to Leeds, and all the other restaurant and buffet facilities on this route are also retained.

Among other London & North Eastern alterations, the Scarborough Flyer will recommence running on Saturday, June 8, and daily a month later. This year it is to start at 11.10 a.m., ahead of the Queen of Scots Pullman, instead of at 11.50 a.m., and will be accelerated to make the run of 188·2 miles to York in 190 min., at an average of 59·4 m.p.h.—the fastest schedule which has ever yet operated between London and York. Scarborough will be reached at 3.15 and Whitby at 4.10 p.m. In the reverse direction the Scarborough Flyer will similarly precede the West Riding Pullman, leaving Whitby at 9.40 a.m., Scarborough at 10.40 a.m., and York at 11.35 a.m. (where connection will be made with the 9.35 a.m. from Newcastle), and reaching King's Cross at 2.45 p.m. The first up journey will be on Saturday, June 15. Another fast run will be made by the Saturday down Newcastle relief (commencing June 29) which has hitherto left King's Cross at 9.30 a.m.; this year it will leave at 9.20 a.m., run non-stop to York in 194 min., and reach Newcastle at 2.24 p.m. The 5.39 p.m. express from King's Cross to Hull and the 5.45 p.m. to Leeds and Bradford are to start at 5.45 and 5.50 p.m. respectively. In Scotland the new 8.55 a.m. from Aberdeen to Edinburgh is to start at 9 a.m. and to reach Edinburgh at 12.4 p.m., as before—the nearest approach to a 3-hr. timing between these two cities that has operated for many years past. A restaurant car runs on this train, returning on the 7.25 p.m. from Edinburgh, which in January last was extended from Dundee to Aberdeen, and connects at Edinburgh with the northbound Queen of Scots Pullman.

On the London Midland & Scottish Railway certain slight alterations are made of the express services reaching Euston shortly after midday. The 9.39 a.m. from Wolverhampton will reach Euston at 12.31 instead of 12.35 p.m., thus taking 70 min. for the 67·6 miles from Northampton via Blisworth (61 min. for the 62·8 miles from passing Blisworth to Euston); the 8.30 a.m. from Manchester will run the Blisworth-Euston stage of 62·8 miles in 61 min., arriving at 12.42 instead of 12.45 p.m.; next will come the Fylde Coast Express, arriving at 12.50 instead of 12.52 p.m., and covering the 158·1 miles from Crewe in 154 min.; after that the Mancunian, with unaltered arrival at 1 p.m., and 172 min. allowed for the 176·9 miles from Wilmslow; and, fifth, the 9.18 a.m. from Birkenhead, arriving at 1.10 instead of 1.15 p.m., and also covering the 158·1 miles from Crewe in 155 min. Four trains will thus follow one another into Euston, each of them on a start-to-stop booking at over 60 m.p.h. A minute off the Blisworth-Euston timing of the Aberdeen express due in Euston at 7 p.m. will make another mile-a-minute timing—62·8 miles in 62 min. No other L.M.S. changes call for remark, except the regrettable deceleration of the 12 noon from St. Pancras to Glasgow, which is to revert to its 11.45 a.m. departure, and will arrive at Leeds and all stations beyond at the same time as before. This train will thus be 13 min. slower than it was before the war from St. Pancras to Glasgow, despite the advances in locomotive power that have been made in the interim. The usual seasonal express services on Saturdays between the various inland centres of population and the coast resorts will be run by both companies to and from the coast, for the most part beginning in June.

L.M.S.R. Departmental Dinner at Manchester

The annual dinner of the Commercial Department, District Goods Manager's Office, L.M.S.R., Manchester, was held at the Midland Hotel, Manchester, on March 11, under the chairmanship of Mr. H. G. Humphreys, who, in proposing the toast of "Our Guests," extended a very cordial welcome to those present, and thanked them for the support to the L.M.S.R. throughout the past year. He concluded his remarks by expressing the hope that the present year would bring increased prosperity to the trading community of Manchester in the near future, with its beneficial reflex to the L.M.S. Railway.

Major W. Peer Groves, M.A., J.P., F.Z.S., responded, and made suitable reference to the activities of British railways, and particularly the L.M.S., and concluded by stating that British railways had foreign railways beaten hollow—which statement he was prepared to maintain after his experience of railway travelling on the Continent and even in the U.S.A. and Canada.

Mr. John E. James, Chairman and Managing Director of the Lancashire Steel Corporation, in proposing the toast of "The L.M.S.R.," said he would put this country at the head of all countries in the world in the matter of developing road transport, but the railway companies ought to have a fair deal. Heavy traffic was a severe strain upon our roads, excellent though they were; moreover, it was becoming a handicap to the quicker moving traffic. He sometimes wondered whether leaders of industry were doing quite what they ought in encouraging that kind of traffic, and suggested that there should be serious consideration of the effect of road transport in weakening the great structure of railway transport, which, after all, meant life and death to a great industrial centre.

Mr. Ashton Davies, Chief Commercial Manager, L.M.S.R., in reply, said the service provided by the British railways was never better than it was today. The railways, in spite of the difficulties of the time, had not been starved. Last year he would assert this country had the finest passenger service it had ever known. The railways gave speed and comfort, and more than that, British railways were the safest form of transport in the world. Business people sometimes put the bulk of their goods transport business on the roads and left the odds and ends to the railways. That could not continue, and he thought the country would have to consider before long whether this tendency should continue. All that the railway companies asked for was fair play. They could still perform services with which the country could not dispense, and were, therefore, entitled to fair play.

Latvian State Railways

The Republic of Latvia, which was created in November, 1918, has an area of 24,400 sq. m. and a population of about two millions. The railway system has a total length of 3,015 km. (1,885 m.), nearly all of which is worked by the State. Its development to meet modern requirements has taken place exclusively since the war. Before that time the lines, which formed part of the Russian railway system, were worked under totally different economic and political conditions, and, while suited fairly well to the requirements of the through traffic of that empire, they were not adapted to the local needs of Latvia proper. These needs are now the ones most requiring attention.

Through traffic to Soviet Russia has gradually diminished in importance, particularly as regards passengers. In consequence of their Russian origin and the vicissitudes of the war, when the Germans were in occupation, the Latvian railways are far from forming a uniform system, there being no fewer than five gauges in the country, the Russian 5 ft., the standard 4 ft. 8½ in., the 2 ft. 6 in. and the 2 ft. The main lines are mostly of Russian gauge, there being 1,789 km. (1,118 m.) of that width. Only 32 km. (20 m.) of the system is double line, and except for this section at certain times, the train service is nowhere frequent.

The old Russian main routes constitute one-third of the whole. Many of the narrow gauge lines were originally field railways and are no longer sufficient for the requirements. A good deal of money, about £1,360,000, has been spent in the last ten years on new work covering a scheme for 663 km. (415 m.) of line, of which 257 km. (160 m.) are now in operation, 523 km. (326 m.) of this scheme are Russian gauge lines, the rest being 2 ft. 6 in. The longest new route now at work is from Liepaja (Libau) to Gluda, 164 km. (102 m.).

Much damage was done to the Latvian railway system in the war, 12 per cent. of the stations being destroyed and 18 per cent. heavily damaged. In the last 15 years, 355 new stations have been built, at a cost of over £412,000, and 150 new bridges, in steel or concrete, at a cost of £390,000. Permanent way work costing £128,000 has been done, and six million new sleepers obtained. Up to March, 1932, £2,364,000 had been spent on improvements to the system, including rolling stock. On the termination of the war there were only 25 old locomotives and 2,082 vehicles available; 50 per cent. of the former and 47 per cent. of the latter wanted repairing and the workshops were not able to meet that demand. The shops have now been reorganised on modern lines and the payment by results system introduced. The time required to overhaul and repair a passenger carriage has been cut from 119 days to 67, and for a goods vehicle from 88 to 31.

Since 1929, 45 broad gauge, 11 2 ft. 6 in. gauge and 25 2 ft. gauge locomotives have been obtained, and 3 railcars. Twenty-four broad gauge engines have been procured from Lithuania in exchange for standard gauge engines. There are now 310 locomotives, but of the 223 for the 5 ft. gauge, only 52 are really modern, and one dates from 1872. There are 860 passenger carriages, but these are not sufficient at the height of the summer season and goods wagons, of which there are 5,807, have to be used for passengers at times. Carriages to the number of 244 and 412 other vehicles have been built in the country.

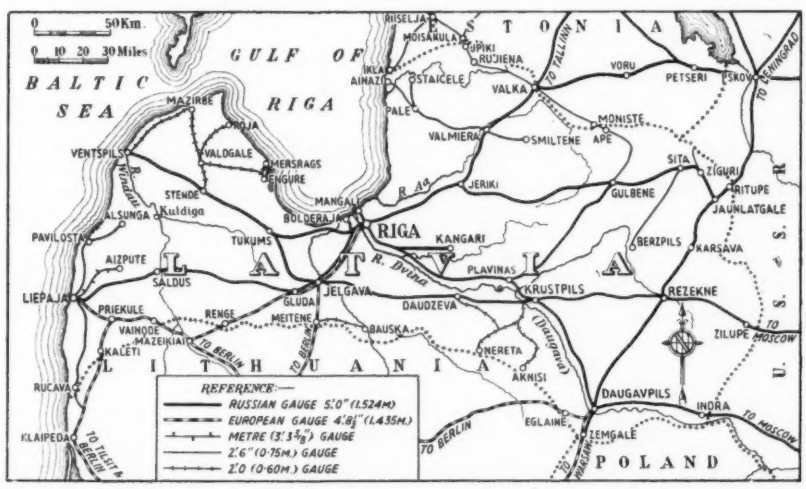
For a long time the defective state of the permanent way was an obstacle to fast running, but speeds up to 85 km. (53 m.p.h.) are now run at times on some sections. Journey times have been much shortened since 1921. In that year the time taken from Riga to Daugavrils (Dvinsk), 217 km. (136 m.) was 11 hours, but is now 4 hr. 19 mins. From Riga to Liepaja (Libau), 230 km. (148 m.) the time was 9 hr. 15 min. in 1921, but is now 4 hr. 47 min. The improvement on other journeys is similar, but even so, the average speeds are not high, due to the trains, including the international expresses, stopping at all stations.

The passenger train mileage has steadily increased and is now 8,086 train-kilometres annually, while the distance run by work trains has fallen as the lines have been improved. The number of passengers rose from 6,260,000 in 1920-21 to 13,978,000 in 1930-31, but has since fallen to 10,634,000. Not only has the general crisis affected the traffic, but the situation in Russia has led to an ever-increasing decline in the passengers travelling there. Goods traffic has also felt the pressure of the crisis during the last year or two. Traffic rose gradually from 1,021,000 tonnes in 1920-21 to 3,933,000 ten years later, but fell subsequently to 2,344,000 tonnes. International traffic has been particularly disturbed and is only a fourth of what it was.

The difficulties so created are considerable. When the Latvian State system came into existence, the question of rates and fares presented a problem. The old Russian rates could not be applied at all and, at first, new rates based on those reigning in Finland were used, until a new schedule could be elaborated. Six classes of freight were recognised at first, gradually increased since to twenty-one. Transit rates are somewhat lower than the ordinary. Compared with the rates applying in neighbouring countries, the Latvian charges are low, and passenger fares are less than before the war.

The capital sunk in the Latvian lines is about £17,200,000. Receipts rose from £777,500 in 1922 to £1,916,500 in 1930, when a decline set in, the last figure being £1,757,500. An improvement is fortunately again being experienced. The operating ratios during the last four financial years have been 81, 93, 107, 105, but these figures take no account of interest charges or payments due to renewal funds, which, if taken into consideration, cause the working to show large losses. These are, however, unavoidable in the present circumstances, the country being so small and having a comparatively poor and scattered population.

The population of the two provincial towns, Riga and Liepaja, is 338,000 and 760,760 respectively. Daugavrils (Dvinsk) has 40,640 inhabitants. The number of persons employed on the State railways was 14,451 in 1920, but was reduced to 12,036 in 1933, and is now about 4 per route-kilometre. Notwithstanding the very great difficulties that the railways have had to contend with since the republic was proclaimed sixteen years ago, progress has been made, and if trade should improve to any extent many anxieties would disappear.



Map of the Latvian railways

THE MONTH'S RAILWAY LAW

Duties of Owners Adjoining Highway

Nicholson v. *Southern Railway Company*. (*The Times*, January 23.)

A curious case affecting the rights of owners of property adjoining the highway arose in *Nicholson* v. *Southern Railway Company* (January 23). On the night of December 10, 1933, the plaintiff was injured while walking along Station Road, Cheam. The road was really a pavement which ran past the Railway Hotel. The pavement was triangular in shape, gradually narrowing down to a point where a privet hedge met the line of the outer kerb of the pavement. On this night the plaintiff was walking along the pavement, and having reached the privet hedge, she stepped out into the road. Thinking that the pavement continued on the other side of the privet, she then stepped up again, but as the pavement did not continue she missed her footing in the dark and fell down a slope which led to a disused chalk pit and broke her leg. The plaintiff brought an action for damages for negligence against both the highway authority and the railway company, who owned the adjoining property. The highway authority sought to throw the duty of fencing, or otherwise protecting the users of the highway from injury, upon the railway company. The railway company stoutly denied that it was under any duty either to fence its property or to light it or to warn users of the highway of the danger. The danger arose from the very common cause that the Cheam Urban District Council decided in 1930 to change a country lane into a busy thoroughfare. The level of the road was raised and the road was widened, so that the edge of the new road stood up 5½ inches from the adjoining path which ran down into the chalk pit. But no accidents were caused until the pavement was erected, and as this broke off short at the Railway Hotel it was a trap for the unwary.

Mr. Justice Branson therefore held that there was a breach of duty which gave the plaintiff the right to recover against the local authority.

Rights Against the Railway Company

Against the railway company the position was different. The case against it—raised, of course, by the local or highway authority—was that the railway company had a duty in Common Law to fence its land adjoining the highway or to build it up so as to avoid the 5½ inches drop. We know that an adjoining owner must not allow his land so to be used as to be a nuisance to those using the highway. It is a different proposition to suggest that if the highway itself has been so altered as to become dangerous, the adjoining owner must alter his land so as to do away with the danger.

Mr. Justice Branson declared that no such duty existed, and he cited an interesting passage from *Cooper* v. *Walker* (2 B & S 773) in which that great judge of former days, Mr. Justice Blackburn, said "Great injustice and hardship would often arise if, when a public right of way has been acquired under a given state of circumstances, the owner of the soil should be held bound to alter that state of circumstances to his disadvantage and loss, and to make further concessions to the public altogether beyond the scope of his original intention. More especially would this be the case when public rights have been acquired by mere user. For instance, the owner of the bank of a canal or river may, without considering the effect of what he is doing, permit passengers to pass along until the public have acquired a right of way there. It is often hard upon him that the public right should have thus been acquired: it would be doubly so if the consequences were that he was bound to fill up or fence off his canal." Mr. Justice Branson concluded that it would be a worse hardship if the highway authority could, by altering the highway so as to constitute a nuisance, throw on the adjoining owner or occupier the obligation to make it safe.

The Railway Rating Case

The Southern Railway Company's Appeal. (*The Times*, February 7.)

The success of the company in this appeal to the Railway & Canal Commission from the Railway Assessment Tribunal, if it is sustained, will be of great value to the railways generally. "The problem what is the net annual value of an undertaking depends," said Mr. Justice Mackinnon, in delivering the judgment of the tribunal "upon various principles both legal and economic. The Railways (Valuation for Rating) Act 1930, Section 4 (1) lays down the provisions to be followed in preparing the railway valuation roll. But from a comparison of this Section with the Rating and Valuation Act 1925, Section 22, it is clear that the old principle of the Parochial Assessments Act 1836 still applies, and the net annual value "is the rent at which the hereditament might reasonably be expected to be let from year to year." The Commission therefore holds that the old rule still prevails that the rent which a hypothetical tenant might reasonably be expected to pay is the net annual value, and that applies to railways under the Act of 1930 as much as to other hereditaments.

The Profits Basis of Rating

The principle of estimating "the annual value," according to Section 4, sub-s. 1, involves the ascertainment of three points, (1) the estimation of the capital value of the plant and implements required by the hypothetical tenant to work the undertaking; (2) the fixing of a percentage to be allowed to the tenant as a reasonable remuneration for the use of his capital: (3) the estimation of the net receipts from the working of the undertaking.

But the main controversy arose in respect of Section 4, sub-s. 2, which provides that in estimating this hypothetical rent the Court need not give effect to any custom or practice affecting the valuation of railway hereditaments before the Act of 1930 as to allowances or deductions, but should act only so as to secure that the estimated rent should represent a fair and just division of net receipts between landlord and tenant.

Mr. Justice Mackinnon and his colleagues thought that the Railway Assessment authority was wrong in requiring that account should be taken of either the landlord's expenditure or the value of the landlord's hereditament.

Rolling Stock

The company claimed that the value of rolling stock should be entered as an item in the tenant's capital account at the replacement cost, less a sum for depreciation. As regards the factor that an engine might be nearing its end as being obsolete, the company claimed that no deduction should be made for replacement costs. Here the Court disagreed, holding that two items should be deducted for depreciation, namely, (1) an average figure for the "log of reconditioning," and to this the company agreed, and (2) (which was contrary to the company's contention) a deduction varying with the age of the type for its obsolescence. This applied not only to engines, but to all types of rolling stock.

Additional Cost as Manufacturers' Profit

The company also claimed to add to the cost of goods manufactured in its own workshops a percentage to represent manufacturers' profits. In addition to this it claimed a further addition as representing a saving of cost owing to "mass production." The Court, however, held that only the actual cost could be deducted, and that the further addition suggested on account of economies due to mass production was quite untenable. Other items dis-allowed in the summary of the tenant's capital were "dies, patterns and moulds," and "drawings and plans." "It must be assumed," said the Court, "that the landlord would lend him these plans, if necessary." In conclusion, the Court found that the tenant's capital was £27,610,690 and that 15 per cent. was the proper allowance to be made and £5,408,000 as the net receipts. The allowance of 15 per cent. on the tenant's capital amounted to £4,141,603, to which must be added £189,266, as the tenant's

share of receipts earned—without the use of the tenant's rolling stock, making £4,330,869 in all. Deducting this figure from the net receipts, the Court arrived at a figure of £1,077,131, which was held to be the net annual value of the company's undertaking as a whole. Under sect. 9, sub-s. 4 (d) the Court has an unfettered discretion as to the costs of an appeal, and these were awarded to the railway company as against the Railway Assessment Authority. The result of this appeal, owing to the reduction in rates, will mean a considerable saving to all railway companies if this principle is followed. But the company has still presumably to face an appeal, which lies, according to the express provision of the Act of 1930, to the House of Lords.

The Carriage of Dangerous Goods

Southern Railway Co. v. Boots Pure Drug Co. Ltd. (*Sol. Journal*, February 9.)

This was a claim by the company for £203 damages sustained through a fire in one of the railway company's trucks alleged to have been caused by the breaking of a carton of nitric acid carried for Boots Pure Drug Co., from Brighton to Beeston, Notts. The glass was said to be too thin to stand the strain of travel by rail. The glass broke and the acid set fire to the straw as a result of which the company had to meet claims amounting to £186. Mr. Justice Mackinnon gave judgment for the plaintiffs for £203.

Level Crossings

Much has been written in the press lately as to level crossings. It is often assumed that it is the duty of the railway company to have a watchman at every crossing, but, of course, this is not so. The Railways Clauses Consolidation Act, 1845, section 68, requires the company to provide accommodation works, including gates, for the use of adjoining owners and occupiers. It would obviously be impossible for the company to keep watchmen at all these gates. But by Section 45 of the same Act, if the railway crosses a turnpike road or highway, either the road is to be carried over the railway by a bridge or the railway over the road. In that case the expense connected with the bridge falls upon the company. With the consent, however, of two justices in Petty Sessions the company may be empowered to carry the railway across the highway, other than a public carriage road on the level. In the case of turnpike roads and public carriage roads on a level (Sect. 47) crossed by the railway, the company is under duty to maintain proper gates and to employ persons to open and shut them. But this liability does not extend to mere occupation roads. The question is one of fact in each particular case—was the company guilty of negligence or not? Should better locking have been provided, should a gateman have been employed, or other means of warning have been given?

A small country lane may develop into a well-used road, and then the company may obtain an injunction against the adjoining landowners on the ground that the crossing is unsuitable and the user dangerous. Thus, in *Taff Vale Railway Company* v. *Canning* (1909), 2 Ch. 48, there was a level crossing to connect agricultural lands severed by a railway. The landowner changed the nature of the user by letting the field, where the level crossing was, to a tennis club, whose members climbed the gate and crossed in large numbers. It was held that the user was unlawful and would be restrained by injunction. Where user in this way becomes dangerous both to the railway and to other traffic, it will be stopped. The Court will have regard to the increased strain and burden upon the company in watching its line and managing the traffic so as to avoid accidents.

Accident to Child

James Reilly v. Great Southern Railways Company of Ireland

This was an action to recover £1,000 damages for personal injuries sustained by the plaintiff in an electrically controlled goods lift in the defendant company's station yard at Harcourt Street, Dublin. The yard adjoins the public thoroughfare and is entered by a gateway which is open all day. The yard is small and at the end farthest from the entrance gate there is a goods lift used principally for the conveyance of milk churns to and from the station platform overhead. From the yard level to the station platform the lift rises about 20 ft. An adjoining flight of 39 steps connects the yard with the station platform and terminates on a landing just where the lift stops.

On August 6, 1934, (August Bank Holiday), the plaintiff, aged ten years, and his companions, whose ages ranged from eight to thirteen years, entered the defendant company's yard while the company's servants were absent. One of the boys placed the plaintiff and others in the lift, closed over its trellis gate, ran up the steps to the control-box landing, found the control-box open, pressed the buttons, and set the lift in motion. When it was descending the plaintiff jumped and grasped the trellis gate on the upper landing and was severely injured by the moving lift. The statement of claim alleged (*inter alia*) negligence on the part of the defendant company in leaving the yard open and unguarded, keeping therein a dangerous machine (the lift) unguarded and unfastened, leaving the lift controls unlocked, taking no precautions against the danger so arising to children while aware that children enter the yard and play with or near the lift. The defendant company's main defence was that the plaintiff was a trespasser and was not on the station premises by the company's permission, expressed or implied.

The action was tried by the President of the High Court of Justice and a Jury at the Four Courts, Dublin, on February 4, 5 and 6, 1935. The evidence on the plaintiff's behalf was to the effect that the yard was a veritable playground for children, but that they never progressed as far as the lift. Cross-examination elicited that children always decamped when a railway servant appeared and that they clearly understood they should not go into the yard. The evidence of the defendant company's servants indicated that trespass in the yard by children was infrequent, and that when it occurred the trespassers were chased from the premises.

The judge's questions and the jury's answers were as follow:—

Did the defendants know or ought they to have known that the yard was frequented by young children?—No.

If so, was the yard frequented by young children with defendants' permission?—No.

Did defendants know or ought they to know or anticipate (1) that a child might go on the lift platform and might operate the lift if the control box was left unlocked; (2) that if so operated that the lift would be a source of danger to other children?—(1) No; (2) Yes.

Was the lift when the control box was left unlocked an attraction for children, and/or dangerous?—No in each case.

Did the defendants leave the control box unlocked on the evening in question?—Yes.

If so, were defendants negligent?—Yes.

Did the injuries result from defendants' negligence?—Yes.

Was plaintiff negligent?—Yes.

The action was dismissed with costs.

This Irish Free State decision is of interest, especially as it appears to run counter to a decision made many years ago in somewhat similar circumstances, when judgment was given against the defendant company.

CORRESPONDENCE COURSES.—"Home Study" is the name given to the new prospectus that has recently been issued by Pitman's Correspondence College, Southampton Row, London. Particulars are given of courses for most of the business professions, including transport, to which 20 papers are devoted. A feature of these correspondence courses is a special guarantee scheme whereby, if the student pays a slightly higher initial fee, the college continues to give tuition until the prescribed examination is successfully passed.

BRITISH STANDARD NOMENCLATURE OF SOFTWOODS.—The British Standards Institution has just published a list of over 70 trade names for softwoods, which are either in common use in this country, or which bear promise of greater development. The table also lists the botanical name according to which the definite identity of the timber may be established, and the country of origin, as well as a list of the various synonyms, both common and botanical, by which the timber may sometimes be named. Copies of this nomenclature (No. 589-1935) may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1 price 2s. 2d. post free.

United Kingdom Railway Officers and Servants Association

Sir Edward Grigg, M.P., presided at the 74th anniversary festival dinner of the United Kingdom Railway Officers and Servants Association in London on March 22. Among those present were:—

Mr. H. Leslie Boyce, M.P., Mr. F. J. du Toit (Trade Commissioner for South Africa), Mr. D. D. Williams, Captain Guy Baxendale, Mr. T. W. Jacobs, Mr. F. W. Tipton, Colonel Miles Backhouse, Mr. A. Pace, Major F. H. Millman, Mr. R. B. Glassborow, Mr. J. A. Kay, Mr. T. Potter. *Southern Railway:* Mr. A. E. Moore, Mr. J. S. Wilson, Mr. A. D. Jones, Mr. T. E. Chrimes, Mr. C. H. Barfoot, Mr. W. Enves, Mr. E. Card, Mr. A. J. Trewren, Mr. K. M. Alexander, Mr. W. H. Mepsted. *London and North-Eastern Railway:* Mr. A. Gregory, Mr. F. C. Wilson, Mr. H. F. Sanderson, and Mr. F. Warriner, Dr. McMahon, Mr. Percy Syder, Mr. G. F. Lofting, Mr. H. C. R. Calver, Mr. S. Bolton. *Great Western Railway:* Mr. C. R. Dashwood, Mr. R. Carpmael, and Mr. H. A. Alexander. Mr. G. Keary (Treasurer) and Mr. Alfred James, Secretary, respectively, of the Association.

Sir Edward Grigg proposed the toast of "Prosperity to the Association." He was not a railway man, he said, although he might claim certain qualifications to speak for the railways. He was, for instance, a director of Thomas Cook & Son, and as such played his part in obtaining passengers for the railways, and as Governor of Kenya he had been responsible for the Kenya & Uganda Government Railway system, which, by the way, had stood the economic crisis best of all the colonial railways. It was about a century since railways began to develop, and, at a time when there was a good deal of discussion about the merits of capital expenditure on public works as a stimulus to prosperity, it was interesting to look back on the development of railways in their early years. In the year 1842-43 the average investment in railways in this country was £4½ million, in 1845 it had risen to £60 million, and in 1846 to as much as £132 million. Private enterprise was responsible for this development, but the Government had also played its part, since Parliamentary powers were necessary to every scheme. If only we could find a similar outlet today for idle capital, unemployment would soon vanish.

Civilisation owed much to railways and to those who worked upon railways. The efficiency of the railway service was marvellous. In 1933 only six persons were killed and 619 injured by accident to trains, although the total number of individual journeys made was well over 1,500,000,000; but during that year nearly 200 railway servants were killed and 15,000 injured in the performance of their duty. It was to help these men and their dependants who were incapacitated by accident that the association existed. It was not entirely a charitable society but depended on subscriptions from members. Annuities of £20,000 to married men and £15,000 to single men had made all the difference to large numbers of men who had been partially disabled in the course of their work on the railways. There were now 593 annuitants and a total of £350,000 had been expended in benefits to railway men, but there were at the moment 31 applicants waiting for assistance and he appealed for generous subscriptions to the funds.

Sir Edward Grigg concluded with a tribute to the courtesy of railwaymen, and referred to the top hat of the stationmaster as a symbol, not only of impartial justice, but of a courtly and vanishing age. When the top hat had gone from churches and from Parliament, and when it had gone from all parts of the West End, he hoped it would remain at our stations as a great symbol. After reading an apology for absence from Mr. Hore-Belisha, the Minister of Transport, who was to have presided, Sir Edward Grigg remarked that in a train we could still go at more than 30 m.p.h., even in built-up areas. He began to think that railways were once again coming into their own.

Mr. F. C. Wilson, Chairman of the Committee, in responding to this toast, said that the association had never yet turned an application down. Eight more applicants had been helped this year than last. Mr. A. D. Jones proposed the toast of "The Visitors," to which Mr. Leslie Boyce replied. Colonel Miles Backhouse, in proposing "The Chairman's Health," also paid a tribute to the courtesy and kindness of railway men of all ranks, and remarked that it was greatly to the credit of the railways that no fewer than 23,000 war disabled men were employed upon them. Mr. Alfred James announced that a sum of £1,350 had been collected at the dinner towards the funds of the association.

Speeding-up of Train Services

In a paper on the speeding-up of train services presented to the Institution of Locomotive Engineers yesterday (March 28), Mr. E. W. Selby considered the various factors contributing to the attainment of such acceleration, with especial reference to that of locomotive power. The objection that extra fast services caused timetable complications could, he said, be overcome by raising the speed of all trains, so that the public would benefit as a whole instead of only the small proportion who used the principal expresses. It was the business of the engineers to minimise the expense so entailed by producing improved and economical locomotives, possessing a degree of adaptability to fit them for varying types of service in order that they could fill in their working days to the utmost.

Mr. Selby then discussed certain points affecting the design of engines for high-speed service. In the matter of piston speeds, he advocated a 24-in. stroke where the railway was very level, and 26 in. or 28 in. to improve climbing speeds over heavily graded lines. To achieve the maximum reduction of weight he suggested aluminium alloy pistons and the provision of three or four cylinders because the motion parts were then smaller and lighter than in a two-cylinder engine, which improved the balance. Splitting the drive between two axles helped to distribute stresses.

The author next described two suggested high-speed designs—one for trains of 100 tons in weight and the other for loads from 150 to 200 tons. The maximum speed in ordinary service was to be 110 m.p.h., with the possibility of touching 120 m.p.h. very occasionally. Among their characteristics were mechanical devices to aid the fireman, high steam pressure, very large streamlined exhaust passages, and a streamlined casing to enclose the engine and tender.

In conclusion, Mr. Selby outlined the considerations affecting the design of coaches for high speed trains, pointing out the advantages of articulated sets, of welding as a factor in weight reduction, and of streamlining to shroud bogies and brake gear from the force of the wind.

Northern Ireland Traffics.—Statistics of railway traffics and receipts in Northern Ireland for the 12 months of 1934, which we have received from the Ministry of Commerce, are compared with the figures for 1932, in view of the abnormal conditions created in 1933 by the railway strike. On railways wholly in Northern Ireland the number of passengers (excluding season tickets) was 5,633,569 in the whole year, compared with 5,647,354 in 1932. Receipts from passenger train traffic were down by £3,238 at £255,355. Decreases of 9,984 tons in the amount of goods carried and of 18,345 in the number of livestock resulted in total receipts from goods traffic for the twelve months of £177,091, compared with £233,172 in 1932. Passengers on railways partly in Northern Ireland decreased from 5,677,447 to 5,231,995, and receipts from this traffic were down by £32,259 at £418,531. The tonnage of merchandise and minerals carried was 930,229 against 1,078,304, while livestock numbered 621,555 against 625,957. Total goods traffic receipts fell by £158,924 to £577,264.

NOTES AND NEWS

Progress of G.W.R. Bill.—The G.W.R. Bill was read for the third time in the House of Commons on March 27.

Annual Dinner of the Institute of Transport.—The Institute of Transport announces that its next dinner will take place at the Connaught Rooms, Great Queen Street, London, W.C.2, on Friday, February 21, 1936.

Another G.W.R. Halt.—The Great Western Railway opened a new halt at Abertafol, between Penhelig halt and Gosgarth halt on the Cambrian Coast, on Monday, March 18. Most of the local services between Machynlleth and Barmouth serve the new halt, and the usual cheap ticket arrangements apply.

Reported Sale of B.A.G.S. Fleet.—We are officially informed that the six steamships comprising the Buenos Ayres Great Southern Railway fleet and averaging approximately 5,000 gross tons apiece, have been sold, three each to two different British shipping companies.

Lynton & Barnstaple Railway.—Despite local requests (to which reference was made on p. 416 of our issue of March 1), the Southern Railway does not find it possible to continue to work the narrow gauge line between Lynton and Barnstaple, Devon. It is therefore announced officially that this line will be closed at the end of the summer train service.

Red Hill-Adelaide Railway.—Reports from Adelaide indicate that the South Australian Cabinet has rejected the proposal put forward by the Commonwealth to buy the Red Hill-Adelaide Railway, and that it has also objected to the proposed construction of a line between Port Augusta and Red Hill. A conference to settle these matters has now been proposed.

Russia's 60,000 Annual Accidents.—According to a press telegram from Moscow, a report issued by M. Kaganovich, the Commissar for Railroads in the U.S.S.R., states there were no fewer than 62,000 accidents and collisions on the Soviet railways during the past year, involving the deaths of hundreds of people and the injuring of many thousands of others. The accidents put 7,000 locomotives out of commission.

Agricultural Traffic on the Derwent Valley Light Railway.—At the recent annual general meeting of the Derwent Valley Light Railway Company, the Chairman, Lord Deramore, referred to the creditable achievement of the system in carrying about 90 per cent. of the sugar beet traffic originating in its area. The tonnage was 7,849, against 3,416 in 1933, the acreage grown having increased considerably. Co-operation with road hauliers had made farm delivery and collection possible, and this facility was being extended. Arrangements were also in force for the loading and unloading of wagons at occupation crossings on the main line. These measures constituted an effective reply to the intensive road competition which the company had to face. Reference to the report of the railway for 1934 is made on page 626.

French Railway Easter Fares Reductions.—Visitors to France from April 11 to May 2 will be able to obtain tickets on the French railways at 40 per cent. reduction on single fares for any journey from port or frontier to frontier or port, provided they make a stay of at least six days in the country. Break of journey at any station is allowed within the validity of the ticket, and the minimum fares have been fixed at fr. 50 for third class, fr. 75 for second class, and fr. 100 for first class.

Annual Exide Convention at Eastbourne.—The 15th annual Exide Convention will be held this year at Eastbourne on May 28, 29, and 30. It will be opened by Mr. D. P. Dunne, Managing Director of the company, and its headquarters will be at the Grand Hotel. An informal reception and dance on May 27, luncheons on May 28, 29 and 30 at headquarters, and a dinner on 28th and banquet on 29th in the Winter Gardens are among the entertainments to be provided for delegates.

Boat Race Grandstand at Barnes Bridge.—Barnes railway bridge, the best viewpoint for the boat race, will again be available for spectators on April 6. Last year, due to the International Rugby Match at Twickenham falling on the same day, the traffic demands of the Southern Railway made it impossible to close the bridge for trains during the race as had been the custom for so many years past. The Southern Railway will run special trains from Waterloo at 1.50, 1.59 and 2.6 p.m., first class only. The special fare (including entertainment tax) is 10s. 6d.

"The Belle of New York."—On Wednesday, Thursday, Friday, and Saturday of this week, the London Transport Players are presenting, at the Scala Theatre, the famous musical comedy "The Belle of New York." It would be only paying a well-merited tribute to the cast as a whole to say that it was difficult to single out any player as being exceptional. The principals carried their parts with a competence and a finish rare even among practiced amateurs. Ichabod Bronson (John Priestley) and Harry Bronson (Alec Pleasance) provided a gallant mixture of the pure and not so pure, while the Belle (Adeline Sealy) herself must have won everyone's heart with her naive demureness and good singing. We can quite imagine that "the stars stood still" when Cora Angelique (Lilian Spracklan) was born. Perhaps some of the most popular interludes came from "Blinky Bill" M'Guirk (James Lewis) and Mamie Clancy (Winifred Sealy). In fact, many were the sighs of approbation to be heard while Mamie was on the stage. It was a good thing that Karl Von Pumpernick (Cyril Corker) failed in his mad endeavours, but on no account would we have wished to miss him.

The Crewe Dinner.—The annual Crewe dinner for past and present Crewe pupils and premiums is to be held this year at the Trocadero Restaurant on Friday, May 17. Those who wish to attend should communicate with the Honorary Secretary, Mr. Reginald Terrell, Wallsend Fuel and Wharfage Co. Ltd., Terrell's Wharf, Townmead Road, Fulham, London, S.W.6.

P.L.M. Sleeping Accommodation at Half-price.—It is possible to obtain sleeping accommodation on the P.L.M. night *rapides* at half price by purchasing special cards available six months or one year. Holders can occupy *lits-salons*, *couchettes-toilettes* or ordinary *couchette* berths on payment of only half the ordinary supplement. The cost of these cards is fr. 439·05 for six months, and fr. 707·85 for a year.

Exhibition of Maps at L.M.S. Stations.—With the object of aiding tourists and ramblers, the L.M.S.R. has made arrangements for the prominent exhibition of the latest Land Utilisation Survey maps at some 50 stations in England and Scotland. Not only do these maps show all the detail which appears on the one-inch ordnance survey maps of Great Britain, but they reveal by contrasted colours the use to which each section of land is put, thus affording a bird's-eye view of the district.

Road Accidents.—The Ministry of Transport return for the week ended March 23 of persons killed or injured in road accidents is as follows. The figures in brackets are those for the corresponding week of last year:—

	Killed, including deaths resulting from previous accidents		Injured	
England...	79	(97)	2,501	(2,903)
Wales ...	5	(3)	97	(123)
Scotland...	16	(28)	253	(320)
	100	(128)	2,851	(3,346)

The total fatalities for the previous week were 106, as compared with 109 for the corresponding period of last year.

L.M.S.R. Silver Jubilee Locomotive.—With the object of making some fitting contribution to the national rejoicing at the King's Silver Jubilee, the L.M.S.R. submitted a request to the King that the company might be permitted to name one of its latest express locomotives *Silver Jubilee*. His Majesty has consented, and the name is accordingly being given to engine number 5552, the first to be built at Crewe works of the latest L.M.S. express passenger type. This class, of which 30 are being

built this year, will be known as the "Jubilee" class. The L.M.S.R. has an engine, number 5348, named *Coronation* which was built at Crewe in 1911.

Canadian National Deficit.—Canadian National Railways accounts for 1934 show a deficit of $48,400,000, a figure which is $10,500,000 lower than the working loss in 1933. Supplementary estimates covering the short fall have been tabled in the Canadian House of Commons.

L.M.S. Employees' First Aid Successes.—Over 8,000 employees of the L.M.S.R. were successful in first aid examinations during the past year, according to the ninth annual report of the L.M.S. Ambulance Centre (England and Wales) for 1934. Successes in the leading districts were: London 937; Bristol and Gloucester 247; Birmingham 477; Manchester 405; Liverpool 441; South West Lancashire 412; West Yorkshire 307; and Lancaster, Windermere and Carlisle 349. The total number of long service medals and bars so far awarded to members of the L.M.S. staff is 2,943.

Southern Railway Holiday Poster.—The very striking picture which is such a feature of the jacket of "Hints for Holidays"—the Southern Railway's wonderful sixpenny annual—has been reproduced as a poster, in a much-enlarged form, of course, and its colouring is dazzling. The picture, it may be recalled, is that of a youthful and beautiful blonde in a very much up-to-date bathing costume. The poster is just the thing for the coming holiday season and is certain to cause many a wild flutter beneath countless masculine waistcoats.

Ottoman Railway from Smyrna to Aidin.—Speaking at the half-yearly general meeting of this company on Tuesday, the President, the Viscount St. Davids, said that negotiations with the Turkish Government regarding its suggestion that it should purchase the railway in accordance with its policy of acquiring public utility undertakings, were now in progress. The result of operations during the period under review had been a profit of £99,000, an increase of £38,000 in the half-year. Traffic in wheat, barley, cotton and tobacco increased, but, although there were 17 per cent. more passengers, receipts from this source were down by 9 per cent. owing to fare reductions instituted as a reply to road competition.

Sale of Chinese Eastern Railway.—In spite of another protest by China, the Soviet Ambassador in Tokyo and the Manchukuo Minister have at last initialled the deed of sale of the Chinese Eastern Railway, which now becomes the North Manchuria system. By the agreement the Soviet concedes all rights in the railway to Manchukuo for Y.140,000,000, exclusive of compensation for employees leaving the railway, totalling Y.30,000,000. At current rate of exchange, the Y.170,000,000 payable in aggregate is equivalent to £9,916,000. A third of the Y.140,000,000, or Y.46,700,000, will be paid immediately after the signing of the agreement, and the remaining two-thirds, Y.93,300,000, in goods over a period of three years and secured by Manchukuo treasury obligations. One special clause guards against further fall in the yen, and another provides protection for Soviet employees, ensuring full payment to them according to existing rules in the event of their future dismissal.

L.M.S.R. (London) Golfing Society.—The eighth annual dinner was held at the Midland Grand Hotel, St. Pancras, on Friday, March 8, when a company of 76 members and guests assembled. Afterwards the trophies competed for during 1934 were presented. The chair was occupied by the Captain of the Society (Mr. A. W. Donaldson), and among the members present were Messrs. A. F. Bound, A. Eddy, J. F. Gee, F. A. Cortez Leigh, G. Morton, H. V. Mosley, F. Roberts, W. A. Stanier, S. J. Symes and E. Taylor. Visitors included Messrs. R. G. Davidson (Southern Railway), C. E. Fairburn (L.M.S.R.), Vernon Gee (L.M.S.R.), C. H. Newton (L.N.E.R.), J. Shearman (L.M.S.R.), Lt.-Col. Gilbert S. Szlumper (Southern Railway), and H. L. Thornhill (L.M.S.R.).

Premises Let at Victoria Station.—On Tuesday the hearing was begun before the Railway and Canal Commission of appeals from decisions of the Railway Assessment Authority in respect of the rateable status of certain shops, bookstalls, offices, toilet saloons and kiosks at Victoria station, Southern Railway. The assessment authority held that certain of these premises should be included in the assessment of the railway company and not separately rated. From these decisions the City of Westminster appealed, on the ground that the premises were so let out that they ought to be separately assessed. In other cases the Railway Assessment Authority held that premises must be excluded from the railway company's draft roll and be separately assessed. From these decisions the Southern Railway and certain of the occupiers, including the Pullman Car Company, appealed. The Railway Assessment Authority is respondent to all the appeals. The hearing continued on Wednesday and yesterday.

G.W.R. Ambulance Competitions, 1935.—An excellent entry of no fewer than 306 teams (118 in the advanced class and 188 in the beginners' class) was received for the company's competitions, which took place in the respective divisions during February. The semi-final round of the competitions, which for the convenience of competitors was held at Newport, Birmingham, Bristol, and Paddington, selected from the 34 teams surviving the divisional contests, the eight teams which will appear in the company's final competition for the directors' shield and prizes. Dr. S. McCormac of Newport and Dr. W. J. Crawford of Southall adjudicated in the team test and individual work respectively in the semi-final contest, and the teams selected were Small Heath, Pontypool Road (advanced), Swindon, Fishguard Harbour, Pontypool Road (beginners), Newport Alexandra Dock, Newport Dock Street, and Liskeard. The Pontypool Road beginners' team has the honour of winning the Henry Butt bowl, awarded to the beginners' team gaining the highest place in the company's contests. The final competition will be held at Paddington on May 3, when Dr. McCormac and Dr. Crawford will again adjudicate, and the two highest teams will represent the Great Western Railway in the inter-railway competition at the Wharncliffe Rooms on May 24.

Irish Transport Strike.—The latest news from Dublin indicates that, contrary to previous practice, the Irish Republican Army has offered to intervene. In the past the I.R.A. has interested itself in labour disputes on the side of the workers, but the feeling aroused by the present transport dispute is so bitter that any offer to use it for political ends seems likely to have grave results. Much now depends on whether the strikers will accept or reject this offer of intervention. But in any case it seems certain that the strike is leading to a first class political crisis in the Free State.

New Young Accumulator Factory.—Consequent upon considerably increased production, the factory of the Young Accumulator Co. (1929) Ltd., which stands on the Kingston By-Pass at New Malden, has recently been extended. The ceremony in connection with the opening of the new building was performed by Earl Howe last week in the presence of a large gathering of representatives of the various interests of the motor trade. The visitors were afterwards shown round the factory, which has been considerably reorganised consequent upon the addition of the new building. The extensions comprise the offices, and those of the works which are subsidiary to the actual manufacture of the batteries, such as battery storage, dispatch, tool shop, carpenter's shop, battery repairs, and battery service station.

The L.N.E.R. Musical Society.—The concluding concert of the season was held on March 22, in the Hamilton Hall of the Liverpool Street Hotel, with Miss Wedgwood, daughter of Sir Ralph Wedgwood, Chief General Manager of the company, in the chair. Among those present were:—

Sir Chas. A. Batho, Messrs. R. Brown, A Burton, O. H. Corble, H. T. Davis, G. H. Drury, H. G. Drury, H. W. C. Drury, E. L. Hawkins, A. W. Headley, W. H. Hyde, R. J. M. Inglis, D. King, Col. H. H. Mauldin, Messrs. L. H. K. Neil, R. R. Pettit, T. Smith, Percy Syder, Capt. F. H. H. Thomas, Messrs. G. F. Thurston, J. C. L. Train, Wing Commander F. H. Unwin, Capt. E. F. Warren, Sir Ralph L. Wedgwood, and Mr. Alex Wilson.

The music was provided by the society's full symphony orchestra and the London section of the male voice choir, with Miss Winifred Kennard, soprano, and Mr. William Biggs, tenor. The conductor was Mr. Leslie Woodgate and the accompanist Mr. Stanley E. Macy.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 12th Week			Totals to Date		
	1935	1934	Inc. or Dec.	1935	1934	Inc. or Dec.
	£	£	£	£	£	£
L.M.S.R. (6,925½ mls.)						
Passenger-train traffic...	380,000	393,000	– 13,000	4,406,000	4,367,000	+ 39,000
Merchandise, &c. ...	472,000	476,000	– 4,000	5,309,000	5,377,000	– 68,000
Coal and coke ...	262,000	271,000	– 9,000	3,224,000	3,275,000	– 51,000
Goods-train traffic ...	734,000	747,000	– 13,000	8,533,000	8,652,000	– 119,000
Total receipts	1,114,000	1,140,000	– 26,000	12,939,000	13,019,000	– 80,000
L.N.E.R. (6.339 mls.).						
Passenger-train traffic...	250,000	258,000	– 8,000	2,954,000	2,908,000	+ 46,000
Merchandise, &c. ...	324,000	332,000	– 8,000	3,690,000	3,811,000	– 121,000
Coal and coke ...	247,000	256,000	– 9,000	2,930,000	3,045,000	– 115,000
Goods-train traffic ...	571,000	588,000	– 17,000	6,620,000	6,856,000	– 236,000
Total receipts	821,000	846,000	– 25,000	9,574,000	9,764,000	– 190,000
G.W.R. (3,749¼ mls.)						
Passenger-train traffic...	152,000	162,000	– 10,000	1,856,000	1,848,000	+ 8,000
Merchandise, &c. ...	187,000	185,000	+ 2,000	2,135,000	2,114,000	+ 21,000
Coal and coke ...	112,000	112,000	—	1,282,000	1,345,000	– 63,000
Goods-train traffic ...	299,000	297,000	+ 2,000	3,417,000	3,459,000	– 42,000
Total receipts	451,000	459,000	– 8,000	5,273,000	5,307,000	– 34,000
S.R. (2,172 mls.)						
Passenger-train traffic...	237,000	235,000	+ 2,000	2,792,000	2,735,000	+ 57,000
Merchandise, &c. ...	62,000	67,500	– 5,500	693,500	756,500	– 63,000
Coal and coke ...	35,000	37,500	– 2,500	421,500	460,500	– 39,000
Goods train traffic ...	97,000	105,000	– 8,000	1,115,000	1,217,000	– 102,000
Total receipts	334,000	340,000	– 6,000	3,907,000	3,952,000	– 45,000
Liverpool Overhead ... (6½ mls.)	1,103	1,044	+ 59	13,074	12,926	+ 148
Mersey (4½ mls.) ...	3,958	4,232	– 274	48,929	50,163	– 1,234
*London Passenger Transport Board ...	529,700	520,300	+ 9,400	20,148,400	19,771,900	+ 376,500
IRELAND						
Belfast and C.D. pass. (80 mls.)	1,683	1,676	+ 7	20,476	20,768	– 292
,, ,, goods	531	534	– 3	5,636	6,359	– 723
,, ,, total	2,214	2,210	+ 4	26,112	27,127	– 1,015
Great Northern pass. (543 mls.)	9,450	8,050	+ 1,400	96,700	85,400	+ 11,300
,, ,, goods	9,100	8,850	+ 250	99,450	100,000	– 550
,, ,, total	18,550	16,900	+ 1,650	196,150	185,400	+ 10,750
Great Southern pass. (2,124 mls.)	22,807	21,521	+ 1,286	224,246	224,645	– 399
,, ,, goods	33,369	30,153	+ 3,216	420,763	383,423	+ 37,340
,, ,, total	56,176	51,674	+ 4,502	645,009	608,068	+ 36,941

* 38th week, the receipts for which include those undertakings not absorbed by the L.P.T.B. in the corresponding period last year; last year's figures are, however, adjusted for comparative purposes

Forthcoming Events

Mar. 29 (*Fri.*).—Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. "The Bend Test and its Value as a Guide to Ductility," by Mr. L. W. Schuster.

Apr. 2 (*Tues.*).—Railway Benevolent Institution, at Connaught Rooms, Great Queen Street, W.C.2. Anniversary Festival.

Hull Traffic Association, at Chamber of Commerce. "Relations between Railways and Traders," by Mr. A. S. Pearson.

Institute of Transport (Birmingham Graduate), at Imperial Hotel, 6.30 p.m. Annual General Meeting.

Institute of Transport (Metropolitan Graduate), at Inst. of Electrical Engineers, Savoy Place, W.C. 2, 6 p.m. "The State and Inland Transport," by Mr. J. A. Williams.

Institution of Civil Engineers, Great George Street, London, S.W.1, 6 p.m. Ordinary Meeting.

Retired Railway Officers' Society, at Abercorn Rooms, Liverpool Street, London, E.C.2, 2.30 p.m. Ordinary Meeting.

Apr. 3 (*Wed.*).—Permanent Way Institution (Leeds), at Quebec House, Quebec Street, 7.30 p.m. "Rails and Tyres."

Society of Engineers, at the Royal Institution, Albemarle Street, London, W.1, 6 p.m. "The Theoretical Strength of Materials and their Practical Weakness," by Sir Willaim Bragg.

Apr. 4 (*Thurs.*).—Institution of Electrical Engineers, Savoy Place, London, W.C.2, 6 p.m. Faraday Lecture. "Electricity in the Life of Today," by Prof. E. W. Marchant.

Apr. 5 (*Fri.*).—Institute of Transport (Leeds), at Town Hall, 6.30 p.m. Annual General Meeting.

Institute of Transport (Nottingham Graduate), at Guildhall, 7 p.m. Annual General Meeting.

Institution of Civil Engineers (Glasgow Students), at Inst. of Engineers and Shipbuilders, 7.30 p.m. "The Development of Modern Bridge Design," by Mr. T. W. Brown.

Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 7 p.m. Informal Meeting.

Railway Club, at Royal Scottish Corporation Hall, Fetter Lane, London, E.C.4, 7.30 p.m. "Railway Stations and Architecture," by Mr. R. M. Robbins.

Apr. 8 (*Mon.*).—Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 5.30 p.m. "The Road and Rail Traffic Act, 1933," by Mr. J. S. Nicholl.

Apr. 9 (*Tues.*).—Institute of Transport (Birmingham), at Queen's Hotel, 6 p.m. Annual General Meeting.

Permanent Way Institution (Sheffield), at Royal Victoria Hotel, 7 p.m. "The Relationship between Signal and Permanent Way Maintenance," by Mr. J. H. Fraser.

British and Irish Railways Stocks and Shares

Stocks	Highest 1934	Lowest 1934	Prices Mar. 27, 1935	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	66½	48½	48	–1
5% Con. Prefce. ...	118	109	112½	–1½
5% Red. Pref. (1950)	115	107	110½	—
4% Deb.	117	105	112	–½
4½% Deb.... ...	119	109	115½	—
4½% Deb.... ...	129½	115¼	124½	—
5% Deb.	135	126¼	136½	—
2½% Deb.... ...	75	64	79	–1
5% Rt. Charge ...	134 7/16	123¼	130½	–1
5% Cons. Guar. ...	132¾	121¾	126½	–1
L.M.S.R.				
Ord.	30½	19½	18	–½
4% Prefce. (1923)	64¼	41	45	–1½
4% Prefce. ...	87	69½	77½	–1½
5% Red. Pref. (1955)	107	92½	100½	–1
4% Deb.	114⅛	100½	104	–1½
5% Red. Deb. (1952)	118 11/16	111¼	116½	–1
4% Guar.	106½	96¾	100	—
L.N.E.R.				
5% Pref. Ord. ...	24¾	13½	11	–½
Def. Ord.	11½	6⅞	6	–⅛
4% First Prefce. ...	76	59½	59½	–2½
4% Second Prefce.	47	25½	22	–1
5% Red. Pref. (1955)	94½	80	81½	—
4% First Guar. ...	104	92	95½	–1½
4% Second Guar.	97⅞	86½	87	–1
3% Deb.	90	74½	78	–1
4% Deb.	114	99¼	102½	–1
5% Red. Deb. (1947)	117	108	112½*	–2
4½% Sinking Fund Red. Deb.	111¼	105¼	110½	—
SOUTHERN				
Pref. Ord.... ...	90	63⅛	82	–1
Def. Ord.	32⅝	19	22	–½
5% Prefce. ...	118 3/16	107½	112½	–1½
5% Red. Pref. (1964)	115¾	107½	114½	—
5% Guar. Prefce.	132	120¾	127½	–1
5% Red. Guar. Pref. (1957)	119½	113	117½	—
4% Deb.	116½	103¼	111	–½
5% Deb.	134	124 15/16	134½	—
4% Red. Deb. 1962–67	113 11/16	105 9/16	111½	—
BELFAST & C.D.				
Ord.	6	5	5	—
FORTH BRIDGE				
4% Deb.	110	100	109½	—
4% Guar.	110	100	109½	—
G. NORTHERN (IRELAND)				
Ord.	9⅝	4 15/16	9	—
G. SOUTHERN (IRELAND)				
Ord.	25	12½	25	—
Prefce.	21½	13 15/16	26	—
Guar.	48	39	59	–½
Deb.	67	59	74¼	–¾
L.P.T.B.				
4½% "A" ...	126	115	121½	—
5% "A"	135½	124½	131½	–1
4½% "T.F.A." ...	113½	107½	112	—
5% "B"	131¾	118	124½	—
"C"	97	73	97	–1
MERSEY				
Ord.	15¼	7	13	—
4% Perp. Deb. ...	93½	82½	94½	—
3% Perp. Deb. ...	66½	61½	69½	—
3% Perp. Prefce....	54	44½	52½	—

* ex dividend

RAILWAY AND OTHER REPORTS

Whitechapel & Bow Railway.—The receipts of this company for 1934 declined from £83,012 in the preceding year to £76,047. Debenture interest took £14,360, leaving a balance of £61,687 to be divided equally between the L.M.S.R. and the L.P.T.B. according to the agreement.

Canadian Pacific Railway.—After full consideration of the net results of the year's operations (to which we refer editorially on page 592) and the necessity in the present unsettled financial conditions of conserving the company's cash position, the directors have decided that the declaration of any dividend in respect of the year 1934 would not be warranted.

Sligo, Leitrim & Northern Counties Railway.—Holders of "A" and "B" debenture stocks have been paid interest at 1 per cent., and since the agreement to accept a reduced rate expired on December 31, 1934, they have been asked to extend the concession for a further three years. After payment of this interest and fixed charges, there remains a debit of £13,989 to be carried forward.

Dundalk, Newry & Greenore Railway.—A deficit of £16,859 on net revenue remained after deducting the expenditure of £25,067 in 1934 from the gross receipts for that year of £8,208. The corresponding figures in 1933 were £8,177 in gross receipts and an expenditure of £23,104, resulting in a deficit of £14,927. Miscellaneous net receipts at £3,889, compared with £4,769, reduced the net loss to £12,970, as against £10,158, and the debit to go forward increased to £329,265.

Clogher Valley Railway (Committee of Management), 1928.—With expenditure for the year ended September 30, 1934, increasing by £501 to £10,264, and gross receipts by £711 to £4,831, the deficit on net receipts was £5,432, compared with £5,643 in 1932-33. Miscellaneous receipts and the contributions from the County Councils of Tyrone and Fermanagh resulted in a total net income of £155 being shown, as against £143 for the preceding year. This sum was fully absorbed in the payment of interest rentals and other fixed charges.

Derwent Valley Light Railway Company.—Net revenue for the year ended December 31, 1934, improved by £177 to £1,988. Expenditure was reduced from £5,894 to £5,488. After adding £1,604 brought forward from last year's account and deducting fixed charges, £1,927 was available, compared with £1,604 in 1933. It has been decided to appropriate £500 to general reserve and to carry forward the remaining £1,428. Traffic during the year has fallen from 55,461 tons to 50,873 tons, coal having declined by 11,296 tons, while merchandise and minerals increased by 6,708 tons. Reference to the annual general meeting is made on page 623.

Peruvian Corporation.—The directors have given notice that, under the scheme of arrangement between the corporation and the holders of its first mortgage debentures, no payment will be made on the debentures on April 1.

West Yorkshire Road Car Co. Ltd.—For the year ended December 31, 1934, the net profit is £58,044, after payment of directors' fees and transfer of £131,022 to depreciation reserve. A final ordinary dividend of 5 per cent., making 10 per cent. for the year, leaves £12,080 to be carried forward, against £12,036 brought in.

Trent Motor Traction Co. Ltd.—This company, in which the L.N.E.R. and L.M.S.R. and Tilbury & British Automobile Traction Limited are interested, shows in its report for 1934 a profit of £41,057, after allowing for depreciation (against £28,923 in 1933). Reserve takes £20,000 (against £5,000); the dividend remains the same at 10 per cent.; and the carry forward is £10,675, against £16,418 brought in.

Cordoba Central Railway.—The secretary has notified the holders of the 4½ per cent. first debenture stock that the company is still not in a position to resume payment of interest, and the directors therefore regret it will not be possible to make any payment on April 1 next. The board has accordingly decided, with the concurrence of the trustees, pursuant to the powers in that respect conferred upon the company by the scheme of arrangement sanctioned by the Court on July 25, 1932, to postpone until October 1, 1935, or until such later date as may with the concurrence of the trustees hereafter be determined, payment of the half-year's instalment of interest on the company's first debenture stock which originally fell due on October 1, 1934, and was postponed until April 1, 1935, as well as of the further half-year's instalment of such interest which falls due on the latter date.

Highland Transport Co. Ltd.—For 6 months ended September 30, 1934, this company, in which the L.M.S.R. holds 50 per cent. of the issued capital, shows a trading profit of £7,509. After allowing for depreciation, directors' fees for 1933-34, income tax 1934-35, and debit balance at March 31, 1934, of £712, there remains a credit balance of £1,788. The directors have decided to pay a dividend of 3 per cent., less income tax, which will absorb £813, leaving a balance of £975 to be carried forward. The directors have decided to alter the close of the financial year from March 31 to September 30, as this will enable the position of the company at the end of each summer season to be ascertained. The next accounts will, accordingly, be made up for the year to September 30, 1935. During the past three years trading in Skye has been a source of considerable loss, and the directors have now been able to sell the business to Nicolson of Portree. The purchase price is £4,500. It is anticipated that this sale will result in a return to the shareholders of about 2s. 6d. to 3s. a share..

British Insulated Cables Limited.—The profit for 1934 amounted to £558,760, against £517,455 in 1933. A further dividend of 10 per cent. on the ordinary shares is recommended, making a total distribution of 15 per cent. for the year. £200,000 is placed to reserves and depreciation account, and the balance forward is £301,000.

British Thomson-Houston Co. Ltd.—The directors recommend payment of a dividend of 3 per cent. for 1934 on the ordinary shares, which are all held by Associated Electrical Industries, Limited. The profits for the year at £346,433, after providing for debenture interest and income-tax, are higher by £99,485 than those of 1933. £122,738, against £92,886, is provided for depreciation, and the carry forward is increased by £21,370 to £250,813.

Associated Electrical Industries Limited.—Following our brief announcement of this company's results last week, the full figures now available in the report show that there was a profit of £586,882 on the year's trading, compared with £397,169 in 1933. The sum available for dividends was £427,852, against £286,813, and the general reserve has been increased from £889,711 to £900,000. The directors announce their intention to redeem out of liquid resources the outstanding £1,036,343 of 4 per cent. debenture stock on or before July 12, 1935.

Vickers-Armstrongs Limited.—A net trading profit of £724,542 was shown on the year 1934, compared with £491,952 in 1933. The balance remaining after deduction of income tax, directors' fees, and depreciation was £357,534, which added to the £77,995 brought forward from 1933 made £435,529 available for the payment of preference dividends. Deducting £330,916 for the service of the "A" preference dividend (less income tax) for the 12 months ended November 30, 1931, left a balance of £104,613 to be carried forward.

Vickers Limited.—The net trading profit for the year ended December 31 last was £970,352, compared with £816,362 for 1933, from which, after the deduction of £357,091 for income tax, debenture interest, and other expenses, there remained £613,261 for the payment of preference dividends. These absorbed £418,190, and the directors recommend that of the sum of £419,112 represented by the balance plus the amount brought forward from last year, £190,890 should be appropriated for a dividend of 6 per cent., less income tax, on the ordinary capital, and £228,222 should be carried forward.

OFFICIAL NOTICES

South Indian Railway Company Limited

THE Directors are prepared to receive Tenders for the supply of :—

STEEL TIE BARS.

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Co. Ltd., marked "Tender for Steel Tie Bars," with the name of the firm tendering, must be left with the undersigned not later than 12 noon on Friday, the 5th April, 1935.

The Directors do not bind themselves to accept the lowest or any Tender.

A charge, which will not be returned, will be made of 10s. for each copy of the Specification.

Copies of the drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 5, Victoria Street, S.W.1.

A. MUIRHEAD,
Managing Director.

91, Petty France,
Westminster, S.W.1.
27th March, 1935.

Bengal-Nagpur Railway Company Limited.

THE Directors are prepared to receive Tenders for :—

(A) WATER SOFTENING PLANT, capacity 9,000 gallons per hour.

(B) WATER SOFTENING PLANT, capacity 5,000 gallons per hour.

Specifications and Forms of Tender can be obtained at the Company's Offices, 132, Gresham House, Old Broad Street, London, E.C.2, on or after Monday, 25th March, 1935.

A fee of 10s. will be charged for each copy of the Specification, which is *NOT* returnable.

Tenders must be submitted not later than NOON on Monday, 8th April, 1935.

The Directors do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right of reducing or dividing the order.

By Order of the Board,

P. W. GIBBS,
Asst. Secretary.

"IMPROVED Device for Gripping and Securing Railway Rails." The Proprietor of British Patent No. 391,533 desires to enter into negotiations for the outright sale of this invention or for the licensing of same in Great Britain.—Particulars obtainable from TECHNICAL RECORDS LIMITED, 59-60, Lincoln's Inn Fields, London, W.C.2.

The Bengal & North Western Railway Co. Ltd.

THE Directors are prepared to receive Tenders for the supply of :—

6 LOCOMOTIVE BOILERS,
6 PAIRS CYLINDERS, &c.,

as per Specification to be seen at the Company's Offices.

Tenders addressed to the undersigned, and envelope marked "Tender for Locomotive Boilers," &c., with name of firm tendering, to be lodged not later than noon on the 30th day of April, 1935.

For each Specification a fee of 10s. will be charged which cannot, under any circumstances, be returned.

The Directors do not bind themselves to accept the lowest or any Tender.

By Order of the Board,

W. R. IZAT,
Managing Director.

237, Gresham House,
Old Broad Street,
London, E.C.2.
26th March, 1935.

THE MADRAS & SOUTHERN MAHRATTA RAILWAY CO. LTD. invite Tenders for :—

1,230,000 DOG SPIKES.

Specification and Form of Tender can be obtained at the Company's Offices, 25, Buckingham Palace Road, Westminster, London, S.W.1.

Fee *ONE GUINEA*, which will not be returned.

Tenders must be submitted not later than 2 o'clock p.m. on Tuesday, 7th May, 1935.

The Directors do not bind themselves to accept the lowest or any Tender and reserve to themselves the right of reducing or dividing the order.

By Order of the Board,

G. W. V. DE RHÉ PHILIPE,
Secretary.

RAILWAY TURNTABLE, 13 ft. 9 in. dia., standard gauge, new or secondhand, wanted.—Write, giving full particulars, Box 295, SELLS LIMITED, 14, Lancaster Place, W.C.2.

CONTRACTS AND TENDERS

The Hunslet Engine Co. Ltd. has received an order for three locomotives for the Gold Coast Government Railways to the order of the Crown Agents for the Colonies. These are 0-8-0T shunting locomotives for the 3 ft. 6 in. gauge, with cylinders 18 in. × 23 in.

Diesel-electric Locomotive for India

Sir W. G. Armstrong Whitworth & Co. (Engineers) Ltd. has received an order from the Bombay, Baroda & Central India Railway for one 350/400 b.h.p. 47-ton diesel-electric shunting locomotive. This locomotive is to run on the 5-ft. 6-in. gauge and in many respects is similar in design to the ten diesel-electric locomotives recently ordered from this firm by the L.M.S.R. (see this column of THE RAILWAY GAZETTE for January 4 of this year), and the Armstrong-Sulzer diesel engine will be identical. Bronze axleboxes, double-reduction gear and such special features as have been dictated by this firm's experience in designing locomotives for tropical countries will be incorporated.

L.M.S.R. Rail Contracts

The L.M.S.R. announces that in connection with the company's permanent way renewal programme for 1935, contracts have been placed with British manufacturers for a total of 80,147 tons of steel rails as follow :—

Barrow Hæmatite Steel Co. Ltd. (13,953 tons); British (Guest Keen Baldwin) Iron & Steel Co. Ltd. (6,489 tons); Cargo Fleet Iron Co. Ltd. (3,311 tons); Colvilles Limited (13,264 tons); Dorman Long & Co. Ltd. (5,397 tons); Lancashire Steel Corporation Limited (8,812 tons); Shelton Iron, Steel & Coal Co. Ltd. (7,134 tons); Skinningrove Iron Co. Ltd. (2,343 tons); Steel Company of Scotland (2,196 tons); United Steel Companies Limited (Workington Iron & Steel Branch) (17,248 tons).

Alfred Herbert & Co. Ltd. has received an order from the Indian Stores Department for one horizontal surfacing, boring, milling, drilling, and tapping machine with motor drive.

Chinese Government Orders

The Chinese Government Purchasing Commission, for the Commissioners of Industries, has placed the following orders, subject to the approval of the inspecting engineers, Messrs. Fox and Mayo :—

Associated British Machine Tool Makers Limited: One universal boring machine.
Alfred Herbert Limited: Two sawing machines.
Reiss Bros. Ltd.: One universal testing machine (Sir W. H. Bailey & Co.).
W. & T. Avery Limited: One impact testing machine.
Wellman Seaver Rolling Mill Co. Ltd.: Plant for the manufacture of seamless steel tubes.
John Lang & Sons: Lathes.
Alfred Herbert Limited: Universal tool cutter and grinder.
Churchill Machine Tool Co. Ltd.: Plane grinding machine.
Jones & Shipman: Drilling machines.
John Holroyd & Co. Ltd.: Automatic bevel-gear planer.

For the Minister of Railways, for the Canton-Hankow Railway :—

Dorman Long & Co. Ltd.: Structural steelwork for carriage and wagon shops.
Rushworth & Co.: Plate bending rolls.
Alldays & Onions Limited; Duplex blower.
James Bennie & Co. Ltd.: Punching, shearing, and bar-cropping machines.
Reiss Bros. Ltd. (B. & S. Massey Limited): Electro-pneumatic forging hammer.
John Holroyd & Co. Ltd.: Axle journal re-turning and re-grinding machine.
Dempster, Moore & Co. Ltd.: Tool-grinding machine.
C. M. Hill & Co. (Carter & Wright Limited): Hot sawing and cold sawing machine.
Fred. Town & Sons: Shaping machine.
Muir Machine Tools Limited: Slotting machines and milling machines.
Summerskill Bros.: Planing machine.
Kitchen & Wade Limited, and Alfred Herbert Limited: Drilling machines.
D. Mitchell & Co. Ltd.: Lathes.
Reiss Bros. Ltd. (Butters Bros. & Co.): One 25-ton and one 10-ton, electric overhead travelling crane.

Nasmyth Wilson & Co. Ltd. has received an order from the Junagad State Railway for one F class locomotive boiler.

D. Wickham & Co. Ltd. has received from the Central Africa Railway orders for one No. 17A motor rail trolley and one low-loading platform trailer.

The English Steel Corporation Limited has received orders for 300 steel tyres for 20-ton wagons and 48 steel locomotive tyres from the Antofagasta (Chili) & Bolivia Railway.

The Egyptian State Railways Administration has placed contracts through the Chief Inspecting Engineer in London as follow :—

Railway Signal Co. Ltd., for supply of signalling material.
W. R. Sykes Interlocking Signal Co. Ltd., for supply of block instruments.
J. Baker & Bessemer Limited, for axles.

Leyland Motors Limited has received orders for 12 Tiger and two oil-engined Titan type passenger vehicles from Southdown Motor Services Limited and the Yorkshire (Woollen District) Electric Tramways Limited respectively.

The Bengal & North Western Railway Co. Ltd. is prepared to receive tenders for the supply of six locomotive boilers and six pairs of cylinders, &c., as per specification to be seen at the company's offices. Tenders must be lodged not later than noon on April 30.

The Bengal-Nagpur Railway is prepared to receive tenders for two water-softening plants, one of 9,000 gall. an hour capacity and the other of 5,000 gall. Specifications and forms of tender can be obtained at the company's offices, 132, Gresham House, Old Broad Street, London, E.C.2. Tenders must be submitted not later than noon on April 8.

Railway Share Market

Stock and share markets made a depressing start this week, but with a more favourable view taken of the European political outlook there was a renewed inclination to purchase stocks giving scope for capital appreciation. In this respect there are indications that home railway issues are likely to come more into favour. With each advance in the price of home industrial ordinary shares the greater becomes the contrast between their quotations and those ruling for the ordinary stocks of the home railways.

Great Western ordinary stock stands at the equivalent of less than 10s. when calculated on the basis of the usual £1 denomination of an industrial share, whilst L.M.S. 1923 preference stock stands at only 9s. and Southern deferred ordinary at around 4s. 6d., prices at which there would be a rush of buyers of "cheap" industrial shares. The prospects of dividends being earned on these three stocks are admitted to be greater than is the case with many industrial ordinary shares now being purchased at higher prices on "recovery" hopes.

In some quarters of the Stock Exchange it is considered the time is ripe for a "drive" in support of a higher range of values for home railway stocks as in most instances they stand at very much lower quotations than prevailed a year ago when trade conditions were less favourable. Traffic receipts are momentarily a depressing influence because of the decreases which, it is overlooked, are caused by the exceptional increases of twelve months ago. Wednesday's traffic statements compared, for example, with a big increase in aggregate takings in 1934. This adverse appearance of the comparative figures will undergo a change after the present week when traffic receipts will commence to go against decreases of a year ago. London Transport Board "C" stock remained steady on balance. With a traffic increase in prospect in connection with the Jubilee celebrations a recovery to parity is anticipated. To pay 5 per cent. on the "C" stock an average increase of 15 per cent. in traffic receipts is required and for 1935 to date the average is about 10 per cent.

In foreign railway stocks Belgian National guaranteed participating preference fell to the lowest price of this year owing to weakness of the belga.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1934-35	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1934	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1934	Prices: Lowest 1934	Prices: Mar. 27, 1935	Yield % (See Note)
				£	£		£	£	£					
South & Central America.	Antofagasta (Chili) & Bolivia	830	24.3.35	11,280	– 1,910	12	145,360	152,630	– 7,270	Ord. Stk.	26 3/4	19	16 1/2	Nil
	Argentine North Eastern	753	23.3.35	6,907	– 74	38	274,482	316,562	– 42,080	,,	11	6 7/8	7	Nil
	Argentine Transandine	111	—	—	—	—	—	—	—	A. Deb.	52	45	45	8 7/8
	Bolivar	174	Feb., 1935	6,600	+ 200	8	12,450	12,950	– 500	6 p.c. Deb.	10	6 1/2	10	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	13 3/4	10 7/16	13	3 13/16
	Buenos Ayres & Pacific	2,806	23.3.35	101,656	+ 7,635	38	2,835,916	3,200,519	– 364,603	Ord. Stk.	16 1/2	8 1/2	6	Nil
	Buenos Ayres Central	190	3.3.35	$102,100	+ $8,900	35	$3,934,400	$3,907,200	+ $27,200	Mt. Deb.	23	10	21 1/2	Nil
	Buenos Ayres Gt. Southern	5,085	23.3.35	179,480	+ 23,032	38	5,446,138	6,132,497	– 686,359	Ord. Stk.	35	22	22	Nil
	Buenos Ayres Western	1,930	23.3.35	50,266	– 5,478	38	1,673,678	1,985,263	– 311,585	,,	27 1/2	18 1/2	19	Nil
	Central Argentine	3,700	23.3.35	117,818	– 306	38	4,478,674	5,068,405	– 589,731	,,	23	13 1/2	14	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	14	7	8	Nil
	Cent. Uruguay of M. Video	273	23.3.35	10,466	– 7,019	38	539,663	624,647	– 84,984	Ord. Stk.	15 1/2	8	7 1/2	Nil
	Do. Eastern Extn.	311	23.3.35	1,975	– 2,127	38	72,303	125,363	– 53,060	—	—	—	—	—
	Do. Northern Extn.	185	23.3.35	1,363	– 826	38	39,568	68,139	– 28,571	—	—	—	—	—
	Do. Western Extn.	211	23.3.35	721	– 1,418	38	30,343	62,865	– 32,522	—	—	—	—	—
	Cordoba Central	1,218	23.3.35	23,710	+ 910	38	1,081,150	1,297,620	– 216,470	Ord. Inc.	6	3	3	Nil
	Costa Rica	188	Jan., 1935	16,816	+ 2,798	30	115,867	128,984	– 13,117	Stk.	30 3/4	23 1/2	31 1/2	6 3/8
	Dorada	70	Feb., 1935	11,000	+ 700	8	21,500	22,000	– 500	1 Mt. Db.	103	95	104 1/2	5 1/4
	Entre Rios	810	23.3.35	10,160	+ 693	38	473,218	482,465	– 9,247	Ord. Stk.	21 1/2	12	12	Nil
	Great Western of Brazil	1,082	23.3.35	9,000	+ 1,200	12	127,700	122,600	+ 5,100	Ord. Sh.	7/8	3/8	1/2	Nil
	International of Cl. Amer.	794	Jan., 1935	$429,477	– $31,256	4	$429,477	$460,733	– $31,256	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	1/-	1/-	1/2	Nil
	La Guaira & Caracas	225 3/4	Feb., 1935	3,400	+ 220	8	6,500	7,580	– 1,080	Stk.	12 3/4	7 5/8	8 1/2	Nil
	Leopoldina	1,918	23.3.35	26,358	+ 743	12	279,039	275,153	+ 3,886	Ord. Stk.	14 5/8	7	5 1/2	Nil
	Mexican	483	21.3.35	$229,100	– $24,100	11	$2,648,900	$2,486,300	+ $162,600	,,	3 1/4	1 1/2	1 1/2	Nil
	Midland of Uruguay	319	Feb., 1935	10,768	+ 1,455	34	89,883	77,993	+ 11,890	,,	1 1/2	1/2	1 1/2	Nil
	Nitrate	401	15.3.35	4,146	– 2,390	10	30,491	36,658	– 6,167	Ord. Sh.	32 9/32	51/-	2 3/8	Nil
	Paraguay Central	274	23.3.35	5,830	+ 2,260	38	186,630	121,630	+ 65,000	Pr. Li. Stk.	84	67	65	9 1/4
	Peruvian Corporation	1,059	Feb., 1935	62,821	+ 11,289	34	499,646	439,952	+ 59,694	Pref.	14 1/2	8	8	Nil
	Salvador	100	16.3.35	¢32,600	– ¢4,900	37	¢721,902	¢726,683	– ¢4,781	Pr. Li. Db.	75	70	70	7 1/8
	San Paulo	153 1/2	17.3.35	36,387	+ 2,367	11	355,537	338,493	+ 17,044	Ord. Stk.	86	67	62	6 7/16
	Taltal	164	Feb., 1935	4,161	+ 1,341	34	20,831	18,412	+ 2,419	Ord. Sh.	2 1/8	1 7/16	1 5/8	6 1/8
	United of Havana	1,365	23.3.35	43,353	– 8,658	38	861,352	660,427	+ 200,925	Ord. Stk.	6	2	3	Nil
	Uruguay Northern	73	Feb., 1935	1,012	– 74	34	9,458	9,391	+ 67	Deb. Stk.	6 1/4	3	4 1/2	Nil
Canada.	Canadian National	23,735	21.3.35	628,224	+ 10,553	11	6,784,811	6,497,669	+ 287,142	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	78 1/4	51 1/2	67 1/2	5 15/1
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	104 1/2	97 1/4	101 1/2	3 15/16
	Canadian Pacific	17,211	21.3.35	427,000	– 16,600	11	4,700,600	4,843,600	– 143,000	Ord. Stk.	185 16/16	111 16/16	10	Nil
India.†	Assam Bengal	1,329	23.2.35	27,735	– 2,748	47	1,283,869	1,134,004	+ 149,865	Ord. Stk.	88 1/2	72	82 1/2	3 5/8
	Barsi Light	202	2.3.35	1,943	– 502	48	127,155	136,927	– 9,772	Ord. Sh.	104 1/2	98 3/4	102 1/2	5 7/8
	Bengal & North Western	2,113	9.3.35	57,173	– 613	23	1,186,433	1,077,278	+ 109,155	Ord. Stk.	297 1/2	262	293 1/2	5 9/16
	Bengal Dooars & Extension	161	2.3.35	2,268	+ 290	48	144,013	140,885	+ 3,128	,,	125 1/4	124	124 1/2	5 5/8
	Bengal-Nagpur	3,269	23.2.35	136,575	– 3,262	47	5,354,838	4,969,505	+ 385,333	,,	105 1/2	96	104 1/2	3 13/16
	Bombay, Baroda & Cl. India	3,072	16.3.35	171,525	– 4,950	50	7,948,725	7,651,575	+ 297,150	,,	115	108 1/2	114 1/2	5 1/4
	Madras & South'n Mahratta	3,230	23.2.35	111,300	– 18,485	47	5,005,842	5,098,913	– 93,071	,,	131	122 3/4	126 1/2	7 1/2
	Rohilkund & Kumaon	572	9.3.35	14,481	+ 774	23	242,713	230,237	+ 12,476	,,	263	250	283 1/2	5 5/8
	South India	2,526	2.3.35	77,751	+ 708	48	3,808,229	3,701,881	+ 106,348	,,	119	115	116	6 7/8
Various.	Beira-Umtali	204	Jan., 1935	64,519	+ 19,077	17	245,504	194,466	+ 51,038	—	—	—	—	—
	Bilbao River & Cantabrian	15	Feb., 1935	2,061	+ 365	8	4,310	3,243	+ 1,067	—	—	—	—	—
	Egyptian Delta	621	10.3.35	6,108	– 152	49	228,250	224,049	+ 4,201	Prf. Sh.	21 3/16	15 3/4	17 3/8	5 3/8
	Great Southern of Spain	104	16.3.35	1,324	– 1,088	11	20,156	23,705	– 3,549	Inc. Deb.	4	3 1/2	3 1/2	Nil
	Kenya & Uganda	1,625	Jan., 1935	239,686	+ 47,245	4	239,686	192,441	+ 47,245	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	50	33	45 1/2	7 11/16
	Mashonaland	913	Jan., 1935	121,793	+ 39,115	17	464,048	359,731	+ 104,317	1 Mg. Db.	101	91 3/4	103 1/2	4 13/16
	Midland of W. Australia	277	Jan., 1935	13,177	– 2,178	30	99,124	95,750	+ 3,374	Inc. Deb.	100	93	96 1/2	5 5/16
	Nigerian	1,905	2.2.35	47,698	+ 1,574	44	1,671,834	1,492,826	+ 179,008	—	—	—	—	—
	Rhodesia	1,538	Jan., 1935	194,575	+ 45,831	17	751,227	614,138	+ 137,089	4 p. . Db.	104 7/8	97 1/2	105	3 13/16
	South African	13,217	2.3.35	549,230	+ 76,032	48	24,833,165	21,863,393	+ 2,969,772	—	—	—	—	—
	Victorian	6,172	Dec., 1934	870,315	+ 101,872	26	4,751,974	4,536,635	+ 215,339	—	—	—	—	—
	Zafra & Huelva	112	Jan., 1935	11,383	– 1,526	4	11,383	12,909	– 1,526	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador receipts are in currency

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements from July 1 onwards are based on the current rate of exchange and not on the par value